THE KENT INCORPORATED SOCIETY
FOR PROMOTING EXPERIMENTS IN
HORTICULTURE

ANNUAL REPORT

(FOURTEENTH YEAR)

1926

I. GENERAL

EAST MALLING RESEARCH STATION

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N. H. GRUBB, M.S.A. (Cornell).
J. AMOS, N.D.H. (Manager Recorder).
A. W. WITT, N.D.H. (Propagator and Recorder),
H. M. TYDEMAN (Assistant Recorder, Plant Breeding).
Miss A. D. MACKENZIE, Dip. Hort. Sci. (Oxford and Reading). (In charge of records.)
A. C. PAINTER (Assistant Recorder).
Miss G. M. BLINKHORN (Assistant Recorder).
Miss M. GILLMAN (Hort. Dip., Swanley), (Assistant Recorder).
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F. H. BEARD (Hort. Dip., Wye), (Assistant Recorder, Hops).

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Pathology : H. WORMALD, D.Sc. (Lond.), A.R.C.Sc., D.I.C.
R. V. HARRIS, B.Sc. (Lond.), A.R.C.Sc. (Special Assistant).
H. M. MOORE (Dip. Hort. Sci., Reading), (Special Assistant).

Entomology : A. M. MASSEE, F.E.S.
R. H. LE PELLEY, B.Sc., A.R.C.Sc., D.I.C. (Special Assistant).

Guide Demonstrator and Exhibitions Officer : H. C. CHAPELOW (Meteorological Records).

Laboratory Assistants : C. CORNFORD, Miss I. D. SKINNER.

Horticultural Advisory Officer to Kent County Council stationed at East Malling : N. B. BAGENAL, B.A. (Cantab.).

Secretary : Miss M. K. GLOVER, F.I.S.A.

Shorthand Typists : Miss M. B. HOAD, Miss E. M. SHEPHERD, Miss E. D. SIMONS.

Visiting Days : Tuesdays and Fridays, or by special appointment.
Hours : 10-12 a.m. 1-5 p.m.

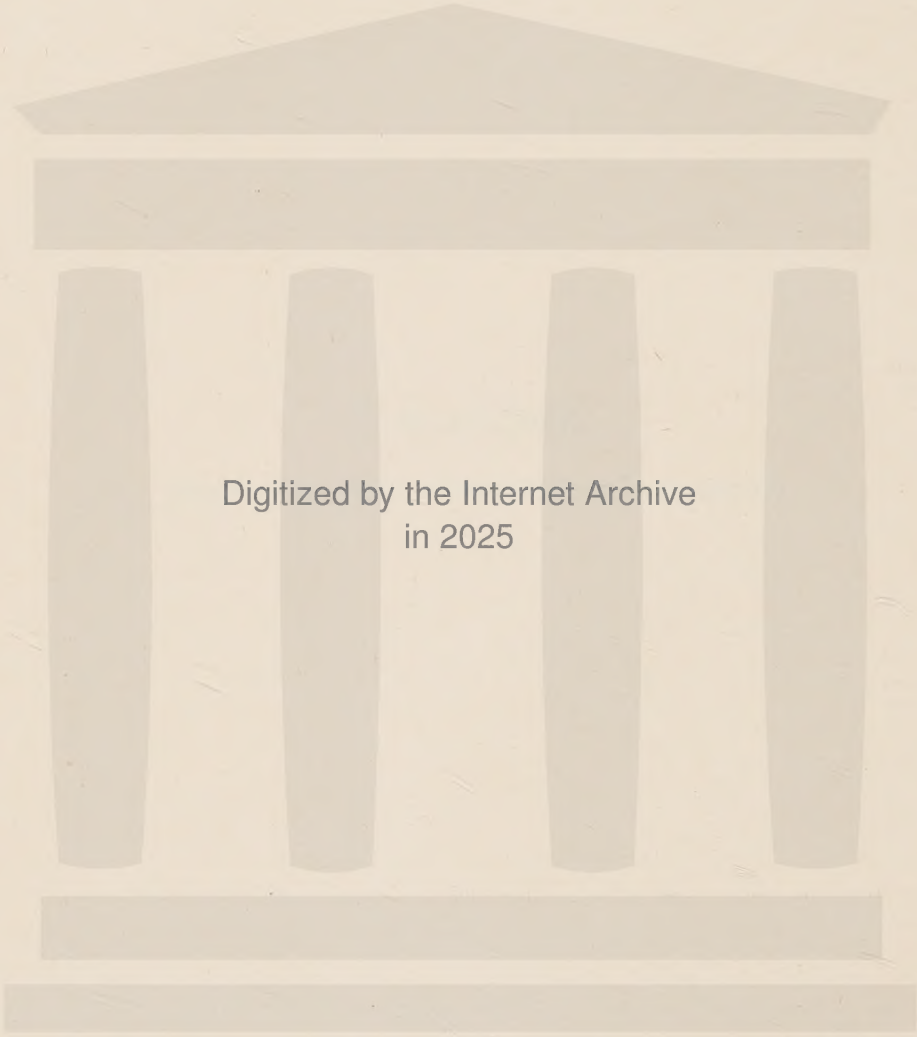
Passenger Station : East Malling Halt. *Goods :* Aylesford.

Bus Services from Maidstone every half-hour to East Malling Church.

Ditton Corner, on the main London to Maidstone Road, is the turning to the Research Station for visitors coming by car.

SECTION I

GENERAL DEVELOPMENT AND ACTIVITIES.



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Section I

GENERAL DEVELOPMENT AND ACTIVITIES.

The year 1926 has been one of continued expansion. There has been an increased demand upon the services of the Staff in almost every branch of activity.

These demands are no longer of a purely domestic nature. From within the Empire and without, the demands for the Station to extend its sphere of activities have steadily increased.

The fact that the Ministry of Agriculture for Northern Ireland looked to a Member of the East Malling Staff to write its official leaflet on Pruning, is but one example of the increasing responsibilities ahead. The spontaneous interest in our work shown by Members of the Empire Marketing Board has further indicated the possibilities inherent in a wider application of its principles and methods. Foreign recognition of the services that the Station has rendered to Horticulture has been expressed by the election of one of the Staff to Life Membership of the Swedish Academie Royale D'Agriculture. Other European countries, through organised visits, lectures and publications, have not been slow to make our findings known to their horticultural industries.

Thus, whilst 1926 saw the practical completion of our original land and building scheme, it also witnessed the growing recognition of the Station's work in a wider sphere, which foreshadows the need for further expansion in the near future.

Committees.

The Committee of Management shares with the scientific world a heavy loss in the death of Professor Bateson, late Chairman of our Research Sub-Committee. The Hop Sub-Committee has also lost a very ardent and helpful member, the late Lieutenant-Colonel Matthew Bell, of Bourne Park.

Sir Daniel Hall as the new Director of the John Innes Horticultural Institution becomes *ex-officio* a member of the Committee. To such a good friend the Station extends the warmest welcome. It also welcomes Mr. J. Kitchin, of Boughton Place, Sandway, as the nominee of the Kent Branch of the National Farmers' Union, to the vacancy upon the Executive Committee.

Mr. T. Harlow has kindly continued to serve on the Buildings Sub-Committee.

During the year the Executive Committee met five times, whilst the Sub-Committees, dealing with Buildings, Hop Experiments and Membership Scheme, met on six occasions.

Amongst the chief subjects dealt with by the Committees, besides general Finance, were the acquisition of more Land, the Plans and Estimates for

the New Laboratories and Administrative Buildings, and the drawing up of the Membership Scheme which involved emendations of the Articles of Association. Before the end of the year all these projects had been satisfactorily settled.

Negotiations for collaboration with the Low Temperature Station, Cambridge, by an extension of their storage experiments at East Malling, were developed, and the Empire Marketing Board had been approached with a view to assistance.

The Hop Committee considered and approved the extended programme of research which was made possible by the special grant.

The Sixth Ordinary General Meeting of the Society was held on March 22nd, 1926, when the Annual Report and Balance Sheet were presented and approved.

FINANCE.

The Maintenance Grants for the Academic Year (1st October, 1925 to 30th September, 1926) received from the Ministry of Agriculture totalled approximately £7,500.

Special Research Grants were received in addition to enable us to continue the Special Investigations into Raspberry Diseases, and to initiate experiments upon the Incidence and Control of Apple Scab.

The Agricultural Education Committee of the West Sussex County Council has followed Kent and East Sussex in making an annual contribution to the work of the Station from County Funds.

Unfortunately, the Sales of Produce for the year showed an unwelcome decrease by approximately £600, owing to the very unfavourable season for fruit crops. This has left the Farm Account with a considerable overdraft.

Under the New Scheme of Membership referred to later a promising beginning has been made in accumulating a Capital Fund for the Maintenance and Development of existing Buildings.

BUILDING SCHEME.

(*a*) *Work in hand.*

The Director's House was ready for occupation by June, though the approaches to it still need considerable attention.

The building of New Laboratories and Administrative quarters, made possible by the Hop Control Grant, was commenced in July, and they should be ready for occupation by July, 1927. Efficient Pathological and Entomological Laboratories, together with their complement of Preparation, Culture, Breeding and Spraying Rooms are included on the first floor, whilst the Administrative Staff will occupy the ground floor. The Building has been erected upon the Society's newly acquired land.

(*b*) *Future needs.*

The erection of the Laboratories already referred to should equip the Station adequately with such accommodation, especially if the Empire Marketing Board agree to make the addition of a Bio-chemical Laboratory.

However, the general accommodation at the Station is still grievously insufficient for the reception of the ever increasing number of home and overseas fruit growers, research workers and students, who pay visits throughout the year. When large parties (often several hundred at a time), come for Conferences, there is nowhere to accommodate them, and the Station's small Library, which should be a place of undisturbed quiet, is in a constant state of upheaval for Lectures, Meetings, etc. Post-graduate Workers, both from English and Overseas Universities, are applying more and more insistently for permission to come to the Station for a period of study and original research. Until adequate accommodation can be provided, the Station cannot fulfil the most useful and natural function of helping to mould the pomological outlook of the rising generation of investigators.

Finally, the valuable collections of Herbarium and Preserved Specimens are deteriorating under present conditions of inadequate storage. There is no more room to extend and supplement them. The exhaustive educational exhibits, which tell in simple terms the economic application of our researches, and are prepared for such occasions as the Wembley Exhibition and the Annual Imperial Fruit Shows, cannot, for lack of space, be placed on permanent exhibition at the Station, and have perforce to be dispersed. Thus an instrument of great educational value is rendered unavailable except for a few days each year.

It will be remembered that a Conference Hall, Lecture Theatre and Herbarium, with Caretaker's quarters attached, were included in the original plan for the New Building, now nearly completed. Owing to the limited sum available for building operations, this section had to be abandoned, but each succeeding year makes the need for such accommodation most insistent.

Whilst it is hoped that our Scheme of Associate Membership may build up a Reserve Fund sufficient for maintaining our Laboratories and Administrative Offices in good repair, we can hardly hope for many years to come to look to this source to provide the accommodation outlined, the urgent need for which itself bears witness to the growing part which the Station is playing in the life of the Horticultural Community, practical and scientific, at home and overseas.

The Fruit and Hop Industry have already given us splendid assistance, and we can only hope that some further support may some day be forthcoming from individuals or corporations as yet unacquainted with the work and needs of the Station.

LAND.

Twenty acres of land (part of Church Fields) separated only by a foot-path from our original Great East Field, and adjoining our Egham Field Hop Garden on the West, have been purchased from Sir John Twisden. The position of this land, together with its apparent evenness, make it especially desirable for the extension of our Experimental Plantings. Though the Station only came into occupation at Michaelmas, a suitable site adjoining the present buildings was selected on this land for the erection of the New Laboratories. This work began in July. The Society holds this land and building in its own name.

STAFF.

We are glad once again to chronicle the fact that the majority of changes upon the Staff have been in the nature of additions.

The Pomological Staff remained unchanged.

We were able to maintain Mr. A. C. Painter's post for another year. Besides being responsible for the picking and marketing of our produce, he gave most valuable help in the "roguing" operations mentioned elsewhere.

During the year, help was given by Miss S. Fillmer (Swanley College) and Mr. S. Y. Hingst (Holland) who came to the Station to gain experience. Before the close of the year Mr. F. H. Beard (Hort. Dip., Wye) joined the Staff as special recorder for the extended Hop Investigations.

During his vacations at Cambridge, Mr. T. N. Hoblyn (Hort. Dip., Wye) again returned to continue his statistical analysis of some of our records.

Mr. D. Hammond has gone to the Royal Botanic Gardens, Edinburgh, to gain experience in propagation work, but his position is being kept open for him. Mr. R. J. Garner (Dip. Hort. Sci., Reading), has joined the Propagation Staff.

The renewal, by the Ministry of Agriculture, of the grant for the investigation of Raspberry Diseases has enabled Mr. Harris, B.Sc., A.R.C.Sc., to continue his work on these diseases. The numerous enquiries received show the interest that growers are taking in the investigation, and, as pointed out in last year's Report, it is greatly to be desired that the work should be secured on a more permanent basis.

During the early months of the year, Miss A. M. Frampton, B.Sc., (Bedford College, London) gave assistance in various pathological problems, in particular taking charge of the spraying trials that have been started. Unfortunately, Miss Frampton was unable to continue the work, but as the Ministry of Agriculture had awarded a grant to the Station for the trials, we were able to secure the services of Mr. M. H. Moore (Hort. Dip. Sci., Reading) who took up the investigation in November.

Mr. R. H. Le Pelley, B.Sc., A.R.C.S., D.I.C., stayed with us until nearly the end of the year to continue the Woolly Aphis Investigations. He has now

taken up a more permanent post, in which we wish him every success and happiness.

Mr. W. Steer, one of the Ministry's Scholarship holders at Cambridge, came to us during the Summer and Christmas vacations and gave general assistance in the Entomological work.

Altogether four advanced Students came to the Station for extended periods of study.

THE SOCIAL AND ATHLETIC CLUB.

In the Report for 1925, the foundation of a Club, responsible for the organisation of all social and athletic functions connected with the Research Station, was noted. At the end of 1925 there were sixty-nine Members on the books. At the end of 1926 the total Membership was eighty-six.

During 1926 various social functions were organised which included a winter outing to London and also a summer outing to Hastings, both of which were well attended. The Club also held a dance in March and a Christmas Supper and Concert on December 20th. Seventy-seven Members attended the latter.

The athletic activities are at present limited to tennis and cricket. During the year the new tennis court (presented by the Governing Body) has been in use and was much appreciated by Members of the tennis section. With regard to cricket, unfortunately, the club does not yet possess a ground of its own. In spite of this handicap ten matches were played during the season with local elevens.

The Club is indebted to East Malling Cricket Club for permission to use their ground for practice on one evening a week throughout the season.

STAFF MEETINGS.

Seven meetings were held during the year 1926, the average attendance being twenty. The general, and sometimes prolonged, discussion which follows each paper is evidence that the meetings are of considerable value to the Staff. A paper dealing with the Statistical Aspects of Fruit Experiments was arranged to coincide with a visit from Mr. F. L. Engledow, M.A. (Cambridge) and Dr. E. S. Pearson, (Biometric Laboratory, University of London).

The arrangements for the Session 1926-7 comprise eight papers, including one by Prof. W. Brown of Imperial College, South Kensington.

COLLABORATION.

The Staff of the Long Ashton Research Station returned the visit which the East Malling Staff paid to Bristol last year. The research programmes of both Stations were interchanged and the various subjects discussed at joint sectional meetings. In some instances the arrangement of duplicate experiments at both centres was found desirable and agreed upon.

The discussion of projects and general interchange of ideas should not only prevent unnecessary overlapping, but should prove stimulating and

conducive to the development of complementary or supplementary investigations where desirable.

Our Physiological problems are still receiving the full attention of Dr. R. C. Knight, D.I.C., of the Research Institute of Plant Physiology, Imperial College of Science. It is to be hoped that at no very far distant date, we shall be able to provide him with the help of an assistant physiologist and the collaboration of a bio-chemist. Special thanks are due to Dr. Knight for the unsparing way in which he has given assistance and good counsel, at a time of considerable stress, in matters of the Station's general well-being, and to Professor V. H. Blackman for his encouraging attitude in this matter.

Professor E. S. Salmon, F.L.S. (S.E.A.College, Wye), is still sending us further new Seedling Hops for Commercial Trial, and he has once again issued a report based on the joint records of the behaviour of his older selections at East Malling. Under his guidance Mr. T. C. Thrupp has been carrying out " mosaic " investigations by grafting methods, in our hop gardens.

Mr. A. H. Burgess, B.Sc. (S.E.A. College, Wye), continues to give us advice upon the chemical aspect of our Hop Manurial Trials. To him and to Mr. F. C. Arnaud, F.I.C. (County Analyst) who once again consented to analyse the manures, our best thanks are due.

Mr. F. T. Brooks, M.A., of the School of Botany, Cambridge, continues to take an active interest in our Silver Leaf prevention and control trials in the Field.

Laboratory tests of the egg-killing properties of certain tar distillate preparations have been continued in collaboration with Dr. W. Goodwin, of the Chemical Department, S.E.A. College, Wye.

The Apple Root-stock breeding work is proceeding in collaboration with Mr. M. B. Crane, of the John Innes Horticultural Institution, Merton. Already some of his new seedling crosses are showing as striking an immunity to Woolly Aphis as Northern Spy itself.

The Journal of Pomology and Horticultural Science.

The Director was asked, by the Publication Committee, at the beginning of the year, to take over the Editorship of the " Journal of Pomology and Horticultural Science." Since there seemed no obvious alternative, he consented to act temporarily as Editor for an experimental period. Though he has received generous help both from members of the Publication Committee and the East Malling Staff, the work entailed has been very considerable, and has inevitably retarded the production of the Station's own Reports. He has, however, consented to act as Editor for a further volume of the Journal pending a final decision on the matter.

Since the Journal presents the most complete résumé of Horticultural

Research in this Country and has a considerable overseas circulation some sacrifice is judged to be worth while.

Outside Trials.

For one more season an intensive study was made of the Apple and Plum Root-stock Trials planted out at Swanley, Tunstall, Wisley, Wisboro' Green, Heston and Warsash. Several new trial plots were planned and planted out on yet other types of soil. A plot of Plums at Brook Farm, Marden, one of Cherries at East Malling, and one of Apples at Churt, Surrey, will in future be under observation.

Altogether the equivalent of thirty-one days' work of a single recorder were spent in pruning and taking measurements etc., on these plots.

Mr. Bagenal gave us assistance on the plot at Tunstall.

The pruning experiments at Parsonage Farm, Brenchley, were continued in collaboration with him.

Advantage has been taken of the soil and climatic conditions of a commercial nursery, which is very successful in establishing stem cuttings of many species of horticultural plants, to carry out a two year trial with stem cuttings of some refractory apple and plum varieties, but the results have not been markedly different from those obtained under our conditions, and the trials will therefore not be continued.

The Mycological Section carried out Spraying Trials against Brown Rot and Leaf Scorch in Cherries upon a Fruit Farm at Goudhurst, whilst the Entomological Staff tested the effect of tar distillate washes upon a bad attack of Woolly Aphis on another commercial plantation.

Our thanks are once more due to all those growers who have given us facilities for carrying on such field work.

Field Telephone.

The task of keeping a complete record of annual growth upon some 2,000 experimental trees has become more and more arduous each year, as has also the summarising of these measurements. When it is realised that many individual trees make from one to two thousand growths annually, the nature of the problem before us will be appreciated. Therefore, when the measuring season began, experiments were made with a light field telephone equipment. The recorder, making observations in the field, has only to carry on outfit weighing $4\frac{1}{2}$ lbs. in all, and the results of his or her labours are transmitted to a second recorder sitting at an adding or type-writing machine in the research buildings. The field telephone has been used with complete success now for two measuring seasons even on those experimental plots most remote from the offices. In consequence, both the summarising of our results and the actual recording itself have been carried through much more expeditiously.

ADVISORY WORK.

(*a*) *Correspondence.*

The number of answers to queries by letter shows almost as big an increase (97) as last year over the previous record. Apart from forty-eight enquiries upon general matters of cultivation, etc., in Kent, passed on to the County Horticultural Adviser, 967 letters were dealt with directly by Members of the Research Staff.

As in former years, the analysis of the subjects dealt with, which is given below, shows that the great majority of enquiries referred very directly to subjects under special investigation at the Research Station.

Pomology.		
Small Fruits (mainly Black Currants and Raspberries)	178	
Fruit Tree Stocks	200	
Propagation	91	
Planning and Planting (in relation to suitability of stock, soil, variety, etc.)	59	
Spraying (general methods for Scab, Big Bud, etc.)	50	
Pruning	25	
Hops	28	
Miscellaneous	114	
		745
Pathology.		
Raspberry Diseases	40	
Hop Diseases	11	
Apple and Pear Scab and Apple Mildew	7	
Brown Rot Diseases	6	
Dieback in Fruit Trees	6	
Miscellaneous	48	
		118
Entomology.		
Gall Mites	23	
Coleoptera (mainly Weevils)	22	
Hemiptera (Aphids, etc.)	13	
Insecticides (use of Tar Distillate Washes, etc.)	12	
Sawfly	5	
Red Spider	5	
Miscellaneous	24	
		104
Total		967

Many of the enquiries have involved the examination and identification of specimens, etc., whilst others have necessitated the drawing up of detailed plans for plantations. In the past season every detail has been supplied in ten such cases for planting over 100 acres of top and bush fruit. This has entailed considerable effort, and it shows that our associate members are making full use of, and getting good value for, their membership.

Though our members are by no means confined to Kent, as the list on pages 97-110 shows, the greatest number of enquiries came from the home county. The written replies in Kent amounted to 380. Sussex growers come second with eighty-three enquiries, almost exactly half from each division of the county. Surrey came third with forty-three, closely followed by Hants thirty-seven, Suffolk thirty-five, and Berks., Bucks. and Oxon thirty-two. Herts., Essex and Middlesex followed with nineteen apiece.

(*b*) *Telephone.*

There has been a very notable increase in the use of the 'phone as a method of enquiry. Though it is very difficult to keep an exact record, it is estimated that between 500 and 600 queries have been thus dealt with. This is approximately double the number in the previous year.

(*c*) *Visits.*

Individual Members of the Research Staff report having paid 183 visits to growers on their farms during the year—another notable increase upon last year. In addition, Mr. Bagenal made some thirty-four calls in Kent as a result of applications from growers to the Research Station.

Though a considerable proportion of these were paid in Kent, Sussex and Surrey, in some cases much longer journeys were involved. Three members of staff, Messrs. Grubb, Harris and Massee spent a week touring the Perth, Forfar, Aberdeen and Glasgow small fruit districts of Scotland. Mr. Grubb also visited the Cherry District in the Teme Valley, Hereford, and Professor Sprenger from the Research Laboratory, Wageningen, was conducted on a short tour in Kent and Worcestershire.

Finally, on the invitation of the Government of Northern Ireland, Mr. Grubb made a tour of Counties Armagh, Derry and Antrim to advise upon methods of pruning.

(*d*) *Roguing and Identification Operations.*

In view of the insistent demands from up-to-date growers for assistance in the " roguing " of their Black Currants for reversion and of stock stool beds for trueness to name, it was decided to make a special effort to meet the situation as far as time would allow. Although a fee was charged, some dozen growers availed themselves of the opportunity and quite considerable areas were rogued.

Unless the demand for this sort of work becomes sufficient to warrant the appointment of a full time expert, however, it will become increasingly difficult for the Research Station to cope with such a demand, though its value is fully recognised.

The research Staff has continued to try and keep in touch with local growers by contributing to the Notes for Fruit Growers, edited by Mr. Bagenal, in the Kent Farmers' Union Journal, and publishing other popular articles.

LECTURES, DEMONSTRATIONS AND CONFERENCES.

(*a*) *Lectures and Demonstrations.*

Whilst Mr. Bagenal's programme of winter lectures to branches of the National Farmers' Union continues to relieve the demands upon our research staff, these calls are again on the increase. Sixteen lectures in all were delivered, six each by the Pomological and Entomological and four by the Mycological Staff. In several cases these lectures were given outside the home area.

In collaboration with Mr. Bagenal, Mr. Grubb gave three pruning demonstrations. One was held at the Research Station, where, for the first time, the Pear Pruning experiments were sufficiently far advanced to warrant explanation from Mr. Amos.

The other two demonstrations were held in commercial plantations, one in the Canterbury district and one at Ryarsh, near Maidstone. At least 100 growers and tree cutters in all attended the demonstrations, despite adverse weather conditions.

Mr. Witt gave some demonstrations in budding and grafting during the year.

(*b*) *Conferences, etc.*

Two Members of Staff contributed papers at Meetings of the Association of Economic Biologists, and two did likewise in the Botanical Section of the British Association Meeting at Oxford.

Two or more Members of Staff have attended the meetings of the Virus Diseases Committee of the Ministry of Agriculture. This Committee paid a summer visit to East Malling.

Members of Staff have also attended the Conferences in relation to Meteorological and Phenological Observations.

The Station continues to be represented on the Agricultural Research Council, the Horticultural Advisory Council, The Horticultural Sub-Committee of the Meteorological Committee and the Publication Committee of the "Journal of Pomology." A representative has been nominated to the Food Canning Council. Meetings relative to the inauguration of a Fruit Soil Survey in Kent have also been attended, and the Station's co-operation promised.

It is to be regretted that the Annual Conference of Research, Advisory and Educational Horticulturists in the South Eastern Province failed to materialise in 1926.

EXHIBITS.

Educational exhibits have again been staged at a number of Horticultural and Agricultural Shows. In most cases, the Exhibitions Officer was assisted daily by the attendance of one or more members of the Research Staff.

For the Royal Horticultural Society's Spring Show at Chelsea (three days) a new Exhibit was staged, illustrating the behaviour of apples on various root-stocks upon widely divergent soils. Illustrations of the trial of root-stocks at the Wisley Gardens were included.

At the Sussex County Agricultural Show held at Eastbourne (three days), an exhaustive exhibit dealing with apple pruning was shown.

Probably the most ambitious undertaking yet staged by the Station was that put up at the Kent County Show, Margate (three days). A complete survey of the Root-stock Experiments and of the Small Fruit Trials and their Diseases was presented.

For the first time, the Station put up Educational Exhibits at the one day Sandwich Autumn Show and the Marden Ploughing Match, since it was felt that attendance at these local shows might interest many who never attended the County Shows.

In the same spirit, an exhibit translating the practical results of our researches into terms of the small garden was staged at the Annual Produce Exhibition of the West Kent Federation of Women's Institutes, held at Maidstone.

At the Imperial Fruit Show, Holland Park, East Malling occupied a stand in the Section belonging to the Empire Marketing Board, and a very comprehensive exhibit was planned illustrating the importance of our root-stock investigations upon apple, pear, plum, peach and cherry.

The precedent created last year of loaning small self-explanatory exhibits to educational authorities in districts where finance and time do not allow of the Exhibition Officer attending, was continued during the year. Loans were made to the Hertfordshire County Council for Staging at the Bath and West Show held at St. Albans, and to the Lindsey division of Lincolnshire County Agricultural Officer.

Considerable advance has been made with the indexing, re-organising and bringing up to date of the various exhibits, but this work suffers from the present limitations of space, and the very useful exhibits cannot be utilised to the full.

VISITORS.

The reception and entertainment of visitors is another growing activity. Eight hundred and sixty-two persons—an increase of some twenty over 1925—are recorded as having visited the Station. Actually the numbers must have approached 1,000, since so many callers now know their whereabouts so well that they make straight for their objective and never sign the book at the Office. Again, where large parties visit the Station, it is rarely possible to get a full record of names or numbers.

Owing to the isolated position of the Station, and the lack of enterprise in the village, it falls to the lot of the Station to provide for the wants of the majority of these guests. This, owing to the wholly inadequate facilities, is no easy task.

Whilst there has been a notable increase in the number of organised parties, the number of individual callers recorded, 585—an increase of 135 over the previous year—has involved very frequent separate tours of the Station by the Guide Demonstrator and other Members of Staff.

The following table gives an approximate summary of the distribution of these visits.

Recorded Visitors, 1926.

Month.	No. of days on which visits were paid.	No. of Visitors per month.
January	11	18
February	8	14
March	14	96
April	10	24
May	11	27
June	17	81
July	18	196
August	20	84
September	21	136
October	16	42
November	11	82
December	5	60
Total	161	862

Though it is now quite clear, after comparison with former years, that June to September inclusive are likely to be the busiest months, there is an ever increasing tendency for the visits to be spread over the whole year; indeed

this year approximately one-third were paid during the six winter months. This goes to prove that the bulk of our visitors are not sightseers, but come for the study of particular problems.

As in previous seasons the station continues to attract a considerable number of overseas horticulturists. The thirty-three such persons recorded included representatives from Canada, Australia, South Africa, the United States, Germany, Holland and Denmark.

Nineteen organised parties, as against thirteen in 1925, paid visits; these parties, on the whole, tended to be smaller, and therefore more manageable.

A notable occasion was the first official visit of the President, Mr. E. W. Langford, and Vice-President, Mr. R. R. Robbins, of the National Farmers' Union. Some 150 Growers from many of the Kent Branches assembled to meet them, and both these gentlemen expressed, in very encouraging terms, their approval of what they had seen and the value of the work to the commercial grower.

Another most interesting occasion was the meeting of Fruit Tree Nurserymen Members of the Horticultural Trades Association, who came for a day of informal inspection and conference.

Other parties of growers included the Faversham and District Branch, the Hereford and Worcestershire Hop Growers, and the Commission for Encouraging Market Gardening in Western Flanders, which was accompanied by Mr. Racymækers (Director) and M. Olivier (Chairman).

The Pruning Conference in December also attracted a considerable body of growers.

Educational Bodies and Institutions have made more use than ever of the Station. The Maidstone and District Teachers' Association paid a visit. In addition to the customary visits of Students from the S.E.A. College, Wye, and the Horticultural College, Swanley, parties were welcomed from Reading University (twice), from the East Anglian Institute, Chelmsford, and from Studley College, Warwickshire.

An interesting innovation has been the experiment of Major Acton, in bringing periodically about forty children from the local Elementary School to see brief practical demonstrations in pruning, grafting, spraying, etc., given by the Guide. The children have shown real interest, and, since from amongst them will probably come the skilled fruit men of to-morrow, the idea seems well worth encouraging.

Library.

It has been found desirable still further to increase the number of periodicals available in the Library, and some new books have been purchased. However, the " waiting list " of both periodicals and books is still of considerable length.

The records show that during the year ninety-two books and 390 periodicals and reports were borrowed by members of Staff, and this does not include daily references not involving removal from the Library.

We have to acknowledge with thanks the gift of a book from Prof. U. P. Hedrick, of Geneva, N.Y., and we express our appreciation of the action of Mr. G. H. Garrad in depositing a set of bound volumes of the Journal of the Royal Agricultural Society of England for our reference.

Our gratitude is also due to Mr. H. R. Beeton for handing on to the Station's Library monthly copies of the " Journal of Heredity."

Distribution of Stocks, Small Fruits true to Name and Experimental Trees.

During the year we have, as usual, distributed large numbers of fruit tree stocks and bush fruits true to name, to other Research Institutions, County Education Authorities, and our Members throughout the British Isles.

As chronicled last year, various collections have been sent to many of the Dominions and Colonies, and this year we have distributed numbers of Apple Stocks, etc., to the Stations at Summerland, Vineland, Guelph and Ottawa, Canada.

We have also supplied requirements of Research Institutions in most of the European Countries and to the Horticultural Departments at Wisconsin, Illinois and Pennsylvania State College, U.S.A.

The demand for selected and standardised material is rapidly increasing and although it involves the inevitable consequence that we are now unable fully to supply the demand, it is a most encouraging sign.

Reports of the behaviour of the Material supplied in previous years to India, South Africa, and other Countries are coming to hand. The results up-to-date, show a very close and somewhat unexpected relationship to those obtained under our own very different conditions.

The Station, in its anxiety to confine its activities in the main to purely experimental propagation, put forward tentative proposals for the taking over of its pure lines by commercial interests. However, since no agreement was arrived at, it has been decided if possible to cater more regularly for the greatly increasing demand of Experimental Institutions for our clone material.

Membership Scheme.

With a view to keeping our supporters in close touch with the Station, and of increasing their numbers (and so building up a reserve fund), the Committee drew up Rules of Membership and altered our Articles of Association to make possible the creation of Associate Members (Founders, Fellows and Associates) of the Society.

Although the Scheme was only in operation during the last six months of 1926, and no special campaign was organised, ninety-three Founder Members, 150 Fellows and 239 Associates were enrolled—a total of 482 Associate Members. Sixty-eight of these are Annual Associates, Fellows or Founders, and the rest Life Members. It is indeed gratifying to be able to chronicle that not a few of our Life Members have spontaneously promised to continue their Annual Subscriptions. It is hoped very greatly to increase the number of Members once the rules and privileges attached become more widely known.

Although many of these Associate Members consist of our old supporters, whose position of Membership was regularised under the Scheme, the first six months result was distinctly encouraging from a financial point of view, some £425 being received in subscriptions.

From our Annual Associate Members, we are already promised approximately £130 a year, and there is every reason to hope that this source of revenue can be greatly increased.

It is proposed that the money received from this Membership Scheme shall be applied primarily to the Maintenance and Development of the existing Buildings and to Capital Improvements.

Administrative Work.

The general expansion of the Station's activities has naturally placed an increasing burden upon the Administrative Staff, which it has not been found possible permanently to augment.

The Administrative Correspondence has grown even more rapidly than the Advisory, over 6,000 communications having been despatched.

The circulation of Bulletins, Stock Lists, etc., has very greatly increased, and the initiation of the Membership Scheme has opened up quite a new line of work. Some temporary help was given to the Office during its initial stages.

The Book-Keeping Department has become very much more complicated, necessitating the handling and analysis of nearly 800 separate accounts.

Some seventy complete pieces of work, including Reports, Memoranda, Programmes of Work, Minutes, etc., have been stencilled. Many of these reports required from twelve to twenty stencils apiece, whilst one reached between fifty and sixty. In most cases a minimum of fifty copies were required.

The reception and entertainment of visitors and the routine work of the Library have again occupied a considerable amount of time. The clerical work involved in the Editorial Work for the " Journal of Pomology and Horticultural Science " is an additional burden.

When it is realised that the bulk of this work has been accomplished successfully during the intermittent ringing of some 5,000 telephone calls, the Administrative Staff must be congratulated on the way it has met all the increased calls.

Section II

The Farm.

Section II

THE FARM.

The fruit crops at the Station during the past year were generally quite up to the average with the possible exception of Apples and Raspberries. Excessive heat during July greatly diminished what promised to be a heavy crop of the latter.

The year will be remembered by many for the scarcity of Apples in most districts, which was due presumably to the inclement blossoming season.

We were, however, fortunate, in that our older trees, some three acres consisting of many varieties interplanted, carried excellent crops which were much envied by the many less fortunate growers who visited us. Despite the prevalence of scab, our control measures proved very effective.

The crop of Plums was above the average. In fact there was a glut of most varieties, and the trees of many varieties needed support. In the case of Victoria and Denniston's Gage thinning of the fruit was carried out with marked beneficial results. The Victoria thinnings paid for the operation.

The shy cropping Cherry Plum (*Myrobolan*) was among the heavy croppers.

Most varieties of Pear carried sufficient fruit on our young trees to enable comparisons of root-stock influence to be made.

Bush fruits were undoubtedly affected by weather conditions.

Black Currants, though not as fruitful as in the previous year, generally carried useful crops. Some pieces of Baldwins yielded up to two tons per acre. Most of the fruit of this variety hung well until August and then realised high prices. The early variety, Boskoop, however, only yielded half-ton per acre.

Red Currants, of which we now have many representative varieties, yielded sufficient fruit to give some indication of their comparative qualities and cropping characteristics.

Clone races of the main types are being propagated for an extended trial.

The collection of some of the large fruited varieties of Gooseberries carried a crop sufficient to allow of various experiments in time of picking and thinning to be carried out, with a view to securing the greatest weight of first class dessert berries.

In the case of all fruits this season, special attention has been paid to the selecting, grading, packing and marketing, and though in a few cases, owing to circumstances outside our control, prices have not always been increased, in the main, the fruit so handled made prices which justified the additional labour cost.

Hops were again a satisfactory crop. Although, in general, yields were not so high as in 1925 many of the New Seedlings yielded over a ton, whilst many of the plots of Tutshams averaged from 23 to 28 cwt. per acre.

Owing to the exceptionally rapid development and ripening of the cones after coming into burr there was a tendency for the cones to "go off" and picking caused no little anxiety.

Downy Mildew was fairly prevalent and serious on certain varieties, others, however, were again outstandingly resistant.

New plantings of fruit consisted of four acres of standard Plums, principally Czars, and a lesser number of Utility and Purple Egg interplanted with an exhaustive variety of Cherries.

A small trial of Hale's Early Peach, in various plum stocks was also planted for training purposes.

A large number of one year bushes of the four main groups of Black Currants raised from single parent bushes of known history was also interplanted in a plot of Plums, together with a lesser number of other sub-types. These will, in future, serve as a source of material for all Black Currants raised for trial or distribution. The extended trial of Raspberries, mentioned in our last Report, was also planted out. These will be grown on the stool system solely for fruiting, and as the varieties are in the main in quadruplicated plots, these should furnish valuable data.

Some three acres of open land was available for full trials. This was planted with British Queen potatoes for the continuation of the spraying trials which have now reached their ninth season. Other field crops grown were Brussels, Runner Beans and Cauliflower. The runner bean trials were continued.

As is mentioned elsewhere some twenty acres of land known as Church Fields, was acquired at Michaelmas.

Ten acres of this were immediately sown down to winter oats and wheat. This portion will, eventually, be used for cherries and for the extension of the Hop Trials, already referred to. The remaining ten acres will also come into fruit. Four acres of this will be used for manurial trials, when the fertility of the land has been reduced, so as to enable early indications of particular selective treatments to become more readily apparent.

Section III

Programme of Research with Brief Progress Reports and Summaries for Fruit Growers.

Part I

Pomology.

Part I

POMOLOGY.

I.—In Relation to Tree Fruits.

Root Stock Investigations.

1. Stocks for Apples.

During the year two reports have been prepared summarising, in detail, the nine years records and observations on Lanes' Prince Albert worked on various stocks, upon the mother plots, and upon four other soils.

At East Malling, with units of twenty trees on each stock, it has been possible to discover significant differences in growth and cropping ranging from twenty to several hundred per cent. These differences fully bear out the original grouping of the layered stocks into four classes.

The check plots, upon widely different soils, confirm, though with a much smaller unit of trees, this grouping in relation to vigour and precocity. At the same time, they emphasise the fact, that, for practical purposes, stocks must be selected in relation to the general vigour of trees on any particular soil.

The analysis of the figures brings out the interesting fact that, at least in the early years, vigour of growth and early bearing are not invariably antagonistic.

2. Stocks for Pears.

(*a*) *Quince Stocks.*

Sufficient evidence is now available to establish the unsuitability of certain quince varieties, including the De Fontenay and Portugal, for a wide range of commercial Pears.

A further season has emphasised the value for early cropping of the unnamed Quince C, which East Malling originally found under the name of Angers Quince (A).

(*b*) *"Free Pear" Stock (P. Communis).*

Clone races from selected seedlings, representative of the wide range of botanical variation, found amongst commercial pear stocks, have now been raised vegetatively in sufficient quantity to allow of comparison as root stocks.

Three series of trees, from one to three years old, fully confirm the marked differences already suspected in the behaviour of different trees on the various

selections of Pear Stock. Not only do they demonstrate a wide range of vigour but problems of "incompatibility" as well.

3. Stocks for Plums.

During the year, a report has been prepared for publication upon the main Plum Stock Trial Plots, eight, seven and six years old, respectively.

The results from the three series of plantings are remarkably consistent, and show that, both in vigour and early productivity, the plum, like the apple, is amenable to a large measure of control through the root stock.

4. Stocks for Cherries.

(*a*) *Acid Cherries* (*P. Cerasus*).

The plantation of Morellos on various stocks, now three, four and five years old, yielded this season a result possibly of pathological significance. Brown Rot disease, from an extraneous source, severely attacked the bushes during blossoming. A statistical record of this attack showed that trees on certain selected Sweet Cherry (*P. Avium*) stocks were consistently more severely attacked than those on other selections. The trees on P. Mahaleb were attacked most severely of all.

(*b*) *Sweet Cherries* (*P. Avium*).

Although in certain seasons comparative failures of buds or grafts upon individual selections suggested the possibilities of an incompatibility problem, a review of the records points to seasonal rather than to varietal causes.

It is already manifest however that the vigour of growth of the scion is not necessarily closely correlated with the vigour of growth of the stock.

The Double Working of Fruit Trees.

(*a*) *Apples.*

A further season's records on these plots go to confirm the deductions of the two previous years.

(*b*) *Pears.*

A preliminary report has been prepared demonstrating the effect upon vigour of certain intermediate scions.

Pruning Experiments.

(*a*) *Apples.*

Records are still being kept on these plots and the accumulated data are being analysed. The work is being extended to a study of the pruned and unpruned trees in a comprehensive variety collection.

(*b*) *Pears.*

The effects of various types of pruning upon vigour and cropping already became very evident this year. At present (fifth year), in all varieties, the trees which have not been leader tipped are by far the largest, though their earlier cropping will doubtless soon reduce this difference.

(*c*) *Plums.*

A series of trees have now been subjected to different degrees and times of pruning for three years.

Fruit Thinning.

Preliminary experiments with both apples and plums were carried out this year mainly with a view to establishing an experimental technique. The result, in the case of apples, probably owing to the light crops, was indefinite. On the other hand, the proportion of plums of marketable size was very obviously increased by thinning.

Manuring of Apples.

Potash Fertilizers have been applied to one-half of the trees of a number of varieties in three of the last four winters. Most varieties show the effect of the manuring on the reduction of the leaf scorch very strikingly; with several varieties the effect on the growth of the tree, the yield of fruit, and the size of the fruit is also obvious. Data on the colour of the fruit are conflicting, possibly owing to the greater leaf surface on the trees receiving potash.

II.—In Relation to Bush Fruits.

Black Currants.

A leaflet has been published bringing up to date the *grouping and descriptions* of the sixty named varieties now growing at the Station.

Clone races of all these, raised from bushes free from "Big Bud" and "Reversion," have been established. The true Baldwin has again excelled in *the cropping trials*. A number of poor cropping "rogue" Baldwins have been collected so that points of distinction from the true variety may be described.

The mass of data relating to the *diagnosis, transmission and control of "reversion"* has been prepared for publication. It has been possible by the consistent exercise of very simple measures to establish strains free of "reversion" in a short time.

Red Currants.

The collections have been considerably enlarged, and progress has been made in the *recognition and grouping* of varieties.

The early *results of cropping* seem to indicate that several of the lesser known sorts, unfortunately not always unmixed or even accurately named, such as the true *Utrecht* and *La Constante* may be of superior value to commercial growers, but it will be another year before serious cropping tests can be established with clone races of the chief groups. The different *methods of pruning* young bushes gave some very definite indications as to the effect on cropping.

RASPBERRIES.

Interesting and important fresh varieties have been added to the collection.

The importance of disease-free strain in the cropping trials is now recognised as being so great, that special attention is being given to the selection and raising of such strains.

A study of the genetic constitution of a number of the main varieties has now been under weigh for four years, and is yielding some promising results.

NUTS.

WALNUTS.

Considerable progress has been made in studying the best means of vegetatively propagating this Genus.

Two methods, one of ring budding in the field and one of herbaceous grafting under glass, have been found consistently successful. Further, it has been found possible to multiply some selected seedling stocks from cuttings.

The Walnut survey however has so far revealed very few good nuts of English origin worth perpetuating, but a comprehensive collection of the best named varieties from France, Italy and America is now being grown for trial here.

SOME NEW AND OLD VARIETIES OF BLACK CURRANT.*

By R. G. HATTON and J. AMOS.

Until quite recent years very little attention has been paid to the development of this modest fruit, so little appreciated in many countries. However, the regular demand for it in England, not only for jam and stewing, but for medicinal flavouring purposes, has made it an attractive fruit for the commercial grower. Moreover, the ills to which the Black Currant has been prone for many years, the " Big Bud," so-called " Reversion," and the " Running Off " of the fruit, have rendered it none too plentiful, and have somewhat stabilised satisfactory prices.

It is not intended here to deal with the recent published results from this and other institutions which have made the economic control of " Big Bud " comparatively sure, and have pointed out the way, through " roguing," to establish strains of currant free from the closely related trouble of " Reversion." Neither is it necessary to enlarge upon the conditions of shelter and cultivation which contribute to minimise the risks of " Running Off," nor to detail those methods of manuring and pruning which have so largely helped to increase the crops at East Malling.

It is appropriate to say something to the supporters of a Soft Fruit Show about Varieties.

Six years ago the writers published in the " Journal of Pomology," Vol. I. Nos. 2 and 3, an article " Black Currant Varieties—A Method of Classification," in which the varieties then in most common circulation were grouped into Four Main Groups and described in detail. It was then noted that, although there were many named varieties of black currant, to all appearances the differences were in fact often so infinitesimal that it was not possible to distinguish them. For instance, although we now have proof that the varieties French and Seabrook's are not identical, we have failed to observe any distinguishing characteristic. It was further pointed out that the majority of seedlings seemed to reproduce the parent plant very closely, hence probably the multiplication of names for indistinguishable varieties. We have little to add to or revise in the grouping we then made, and in the past six years we have succeeded in identifying many hundreds of specimens from various districts, both in winter and summer from the characters we then described. There are people who are apt to quarrel with our initial grouping into " Red Bud Types " and " Whitish Bud Types " because they do not seem to realise that in nature such terms must be relative and comparative. Particular seasonal and climatic conditions, differences of

* Reprinted from the Catalogue of the Kent Cherry and Soft Fruit Show, July, 1926.

location and culture, all tend to modify such hard and fast lines, but we made this distinction because it appeared to be a good initial key to indentification. We still think so, and when folks send us a pink budded Baldwin to prove that we were wrong, we still ask them to look at their Boskoops and French and see if they are not deep crimson, and still distinguishable. In any case, there are so many distinctive characteristics of these four groups, both in winter and summer, that there is really no mistaking them, and we see no reason for modifying our classification. However, since we reviewed the situation in 1920, there has been a considerable number of new introductions about which growers are beginning to make enquiries, and, since we have had a number of these under observation for some time, we think growers may be glad to learn something of their character and possibilities.

These new introductions came from several sources. Some enterprising horticulturists, such as Messrs. Laxton, of Bedford, Mr. Davison, of Westwick Gardens, and Mr. H. Jones, of Market Drayton, have set themselves to make definite new crosses and raise new varieties. Others have looked abroad to see if our neighbours are growing anything better than we are, whilst others again have rehabilitated old friends of good history and brought them back into the daylight. Now, whilst a few of these new varieties are really new departures, combining, as we here have proved possible in our breeding experiments, good qualities of two varieties and appearing obviously as a cross, a very large number of these new named sorts can still be placed quite readily in one of our four groups, sometimes as indistinguishable, sometimes as a slight variant.

We propose here to recapitulate those summer characteristics of the four Groups which will be most obvious and helpful to fruit growers, and to say something under each Group of the new arrivals, and any outstanding merit which they seem to possess. Finally, we propose to say a word, as before, about those varieties which do not fall readily into any of the four Groups.

Reddish Budded Groups.

Group I.—Represented by French Black.

The blossom bunches (racemes) number from one to three per node.

The Stalk (peduncle) is of medium length and slightly drooping.

The Flowers are tinged pink.

The Leaves are regular in shape with acutely pointed lobes.

Where the Leaf Stalk arises from the leaf blade (a point known as the leaf sinus), the sinus is shallow to flat.

The Leaf Stalk (petiole) is of medium length and pinkish in colour.

The Leaf Blade gradually bends obtusely from its stalk.

The Fruit is medium to small in size, tough skinned, acid and mid-season.

The Bush is large, compact, much branched.

The following varieties fall readily into this Group :—

Benton's—a Norfolk selection.

Black Grape.

Defender.

Mammoth.

Merville de la Gironde syn French.

Mite Free (F. Seedling) new introduction of Messrs. Laxton, has a slightly deeper leaf sinus, and purplish leaf stalk.

North Holland.

Ogden's.

Resister.

Seabrook's.

Siberian.

Westwick.

The appearance and behaviour of all the above varieties have been so nearly identical as to need little further comment. We have, by investigating the "build up" of these varieties in breeding experiments, been able to prove that in fact they are not all identical. Seabrooks and Siberian have in their make-up a common addition not possessed by French and most of the others in the Group.

Many of this group by name or fame claim to be mite resisting, under our conditions it might be more accurate to say that they do not *show* Big Bud readily.

This Group must approximate very closely to the Common Black, and there appears to us very little to choose between the varieties. Under our conditions, the group has proved a useful mid-season one, of moderate cropping power, which most large growers of blacks cannot afford entirely to neglect. If conditions of shelter, climate, location and culture suit these varieties, they are known to do well.

Group II.—Represented by Boskoop Giant.

The Blossom bunches (racemes) are usually single.

The Stalk (peduncle) is long, held horizontally at first, later pendulous.

The Flowers are reddish in colour.

The leaves are regular in shape, but the lobes are somewhat obtusely pointed.

The Leaf sinus is usually deep.

The Leaf Stalk (petiole) is long and pinkish in colour.

The Leaf Blade is almost at right angles to the stalk.

The Fruit is large, tender skinned and moderately sweet, and early in season.

The Bush is large, spreading and somewhat sparsely branched.

The following varieties appear identical :—

Black Prince.
Edmonds', a Kent selection.
Hoogendyk's, syn. Boskoop Giant.
Prince of Wales.
Rosenthal's, a new introduction from the Continent, which appears identical.

Several other varieties, recently introduced from the Continent, are certainly not identical with the above, but their general characteristics proclaim them as near relatives.

Hugo Vallen is very similar in character of bunches and flowers, though the leaves are rather more acutely pointed and hang more obtusely from their stalks. The fruit appears to be much later in season. The bush itself is more erect.

Tony Black is difficult to distinguish from the above.

Theunis, whilst appearing distinct from the last two, in virtue of its shallower leaf sinus and shorter fruit bunch, is otherwise very similar.

This Group invariably grows well, but under certain conditions is very liable to " run off." Under others, however, especially on very heavy and very light land, it often sets well. As the earliest English berry to come on the market, it is almost essential to grow for succession purposes.

Whitish Budded Groups.

Group III.—Represented by Goliath.

The Blossom Bunches (racemes) are usually crowded, three or more in number.

The Stalk (peduncle) short, rigid and often upturned.
The Flowers are bright yellowish tinged with pink.
The Leaves are very irregular in shape.
The Leaf Sinus somewhat shallow.
The Leaf Stalk is short and light green in colour.
The Leaf Blade is bent right over.
The Fruit is very large, sweet, medium tender and mid-season.
The Bush is large and very erect, then spreading.

The following varieties can be placed in this group as very nearly identical :—

Goddard's Monarch.
Edina.
Cherry.
Bang Up.

Hatton Giant, a new seedling, raised by Mr. H. Jones, of Market Drayton, producing rather longer trusses, with very pale flowers. The leaves are, if anything, rather more regular.

Monarch, syn. Goddard's.

Orr's a seedling introduced by Mr. W. Orr, of Bootle. Trusses appear rather longer, flowers very pale.

Peplow, another seedling of Mr. H. Jones'. Very similar to Orr's and Hatton Giant.

Victoria. It is now known that the late Mr. G. P. Berry selected Goliath from this, and Messrs. Scarlett, of Edinburgh, propagated it.

Vindrue, or Long Bunch. A Continental variety probably wrongly named.

White's. This variety came from the Experimental Station, Ottawa, labelled White's Stock, and is obviously a member of this Group.

We possess two other varieties which can conveniently be grouped here :—

Trinder's Long Bunch, whilst being very similar in general leaf and growth characters, except for pinkish leaf stalks and leaves held more horizontally, has longer and fewer bunches of fruit, which droop ; the fruit is smaller and earlier, under our conditions, than the Goliath.

" Maple Leaf," a variety of no economic value, yet not infrequently found as a " rogue " amongst varieties in this group. Sent to us under this nickname by Mr. Goude, of Norfolk.

As a palatable dessert fruit, and as a fine Show berry, this Group stands alone, the only disadvantages being that the berries are apt to ripen rather unevenly and are often none too easy to pick as the bushes get older. We have seen it doing well on many soils.

Group IV.—*Represented by Baldwin.*

The Blossom Bunches (racemes) are usually two's and three's.
The Stalk (peduncle) is medium in length, semi-rigid and waved.
The Flowers are greenish with a slight pink tinge.
The Leaves are very regular and acutely pointed.
The Leaf Sinus is usually noticeably deep.
The Leaf Stalk is of medium length and slightly pink.
The Leaf Blade is frequently slightly twisted on its stalk.
The Fruit is of medium size, very tough and acid, and late to ripen.
The Bush is comparatively dwarfish and compact.

Although a considerable number of varieties clearly belong to this Group, many of them have distinguishing characteristics. Those most closely resembling Baldwin are : —

Black Naples, which, we agreed with Mr. E. A. Bunyard, belongs to this Group, though we have received French types under this name.

Boddenberg. We have also received from Canada quite a distinct variety under this name.

Carter's Champion. The true Carter's seems most certainly to belong here, though a very worthless and distinct variety is not infrequently circulated in place of it.

Champion, Syn Carter's.

English's Prolific, a Kent selection.

Ensden Defiance, a Kent selection.

Lee's Prolific. Here again we have received a rather distinct variety belonging to the French group under this name also, but from former descriptions, we believe the true Lee's belongs to Group IV.

Wallace's, a new seedling from Messrs. Wallace, of Eaton Bray.

The following varieties are more clearly distinguishable, but bear all the traces of a fairly close relationship to Baldwin.

Coronation, which ripens mid-season, and is earlier than Baldwin, also more dwarfish.

Kentish Favourite. See Nicholl's Syn.

Nicholl's. A new seedling raised by Mr. G. Nicholls, of Rough Common, Canterbury. The racemes are usually in pairs, the leaf sinus is not so deep and the leaf stalk more highly coloured, the leaf blade held more horizontally and the bush more open and spreading.

Norton. Syn Nicholls'.

Daniel's September, introduced by Messrs. Daniels, of Norwich. Though remarkably like Baldwin in general appearance, the flowers and leaf stalk are more highly coloured, and the bush more vigorous in growth. The fruit of the true variety is much later in ripening.

Hatton Black, another of Mr. H. Jones' seedlings, has much more drooping trusses and more highly coloured flowers. The leaf sinus is comparatively shallow and the bush more vigorous, open and spreading. The fruit is large, moderately tender and sweet, and apparently early to mid-season. An early seedling in this group with the cropping capacity of the Baldwin, may prove very valuable.

Two other varieties appear to belong to this Group, One, Florence, from Mr. T. Pateman, of Hatfield, approaches Coronation in earliness. We have not yet had Mr. A. Trail's Coultermain's long enough to express a more decided opinion.

There is another class of recently introduced currants, which, though very distinct in fruiting characteristics, falls naturally into the Baldwin Group.

Blacksmith, Laxton's, in its summer characters is not infrequently mistaken for Baldwin. The bushes are, however, much more vigorous and erect, and the leaves more crinkled. The blossom bunches are usually single, and

much longer, horizontal at first and then drooping, the flowers are very pale in colour, and the fruit much earlier to ripen.

Tinker, another seedling of Messrs. Laxton's, is very similar in character to the above, though more spreading. Under our conditions has set its fruit better. One would surmise that it is a Baldwin Boskoop combination, in which the vigour and long truss of the Boskoop are fairly successfully blended with the vegetative and better setting characteristics of the Baldwin.

Raven, yet another seedling from the same firm, appears similar in leaf and growth character, but we have not had it under observation long enough to say much.

The true Baldwin type in Group IV has proved outstandingly prolific, not only under our conditions, but on the great majority of soils upon which we have placed it. At the same time, this variety is the most susceptible to soil influences, which are readily shown by differences in vigour of growth. Though we believe it will succeed admirably on all types of soil, the distances for planting and methods of cultivation and manuring must be properly adapted in order to ensure this. It is an essential climax to the succession of black currants, and we have always made the biggest price of these late hanging berries.

Finally, a word should be said about the distinct group of Canadian Black Currants, raised by the late Dr. Saunders, and obtained by this Station in 1920 and 1921, from Mr. W. T. Macoun, of the Dominion Experimental Farm, Ottawa. Two bundles of these, labelled White's Stock and Buddenborg, contained bushes of the Goliath Group, but all the others seem to show a close family relationship, distinct in wood, leaf and fruiting characteristics from our European sorts. The following is a short description of the Group :

Group V.—(Canadian Group).—Represented by Eagle.

The Blossom Bunches (racemes) are usually in pairs.

The Flowers are tinged pink.

The Leaves are regular in shape and acutely pointed, but possess a remarkably glossy surface.

The Leaf Sinus is usually deep.

The Leaf Stalk is short and very slightly coloured.

The Leaf Blade is almost horizontal.

The Fruit is small in size, rather tender skinned, but very acid, and earlier even than Boskoop Giant to ripen. The bush is of medium vigour and erect.

The following varieties belong to the same Group :—

Climax, which has a paler flower, more irregularly shaped leaves, held obtusely, the fruits are mid-season in ripening, are tougher skinned and milder in flavour.

Kerry.

Magnus, the blossom bunches are apparently usually single and slightly longer.

Ontario.

Saunders.

Topsy, which is supposed to be a hybrid between black currant and gooseberry.

We obtained these varieties mainly for two reasons, their reputation for heavy cropping in Canada, and in the hope that they might prove resistant to "Big Bud" and "Reversion." Under our conditions, so far they have not fulfilled either expectation, though their exceptional earliness here might justify their inclusion in a more exhaustive trial of their capabilities.

We have not dealt with the new crosses raised by Mr. G. Davison, for, although we have seen them growing at Westwick, we have as yet not had any of them here sufficiently long to become familiar with them. Many of them appeared to us to bear the obvious characteristics of two varieties, and this would seem to be confirmed by Mr. Goude's description of them in the "Journal of the Ministry of Agriculture," Vol. XXXI., No. 8.

Finally, we would like to add that our demonstration plots of many of these sub-types and newer varieties have consisted in the main of too small units of bushes (usually twenty to twenty-four) to enable us to give any accurate measure in figures of their cropping performance. It has only been possible to record the general characteristics of these varieties and to watch for any outstanding differences which would justify their selection for inclusion in a more exhaustive cropping trial.

Apart from the somewhat outstanding characteristics of Mr. H. Jones' Hatton Black, and Messrs. Laxton's Tinker, none of the varieties we have collected here appear to be very new departures, or, under our conditions, marked improvements upon the older varieties. These two we should certainly include in a more thorough trial, with possibly one or two of the Canadian varieties.

CHARACTERISTICS AND SUITABILITY OF THE SO-CALLED "PARADISE" STOCKS.*

Notes by R. G. HATTON.

The following Notes have been put together at the request of several Nurserymen, who, from time to time, have asked for specimens of one or all of the varieties mentioned below, and are now asking for some guidance as to their selection and multiplication. A number had perforce to be given to each variety of stock as it was isolated and described, since its true name was frequently in dispute, if not entirely lost. The numerals are, as a matter of expediency adhered to, since the stocks were distributed under them and often possess no other designation. East Malling has urged, wherever possible, the adoption of a uniform agreed nomenclature.

Varieties No. X., XIII., XIV., XV., and XVI., were introduced from Germany by East Malling in 1914. They were new seedling varieties from Messrs. Späth, Berlin, and only possessed seedling numbers. In many cases the samples of these were received mixed. These notes, which from their nature, are bound to generalise, are compiled from observations made upon trees, ranging from ten to four years old, of some dozen or more commercial varieties, worked upon the various stocks, and from six experimental plots upon very different soils (comprising some sixteen acres).

It has been suggested that it is as yet too early to draw any deductions, but it must be remembered that mature trees on Nos. I., II., III., IV., V., VI. and VIII., are readily identifiable from suckers on most fruit farms, and that the deductions drawn from the young experimental plots can be very readily checked in that way. Such opportunities have naturally not been missed.

With regard to the Layered Free Stocks, Nos. XII., XIII., XV., XVI., Crabs A, C and F, all of which seem to possess promise and points worthy of trial for standard work, East Malling has always emphasised that their true value can only be measured by practical test.

Their capacity for good anchorage has certainly been well tested upon this windy spot, and it is fair to draw comparisons between their roothold and those of other varieties such as Nos. I., II. and IX., growing side by side. As to whether trees worked upon layered stocks will be necessarily short lived, trees on many other apple and plum stocks, so raised, can already supply an answer. How soon do trees on Nos. I. and II. die out, if properly treated? Or do we shrink from using Plum and Cherry suckers (nature's layers) on these grounds?

* This article appeared in substantially the same form in the *Horticultural Adviser*.

We do know that a flat of trees worked upon these layered stocks shows much less variability in vigour and anchorage, than a flat on seedling stocks; as do the trees ultimately in the plantation. We therefore recommend them as worthy of a fair trial.

Whilst it has been suggested that the suitability of every variety of stock for every possible variety of scion and soil should be worked out before any move is made in selecting and discarding, it is felt that the vast amount of evidence now available does justify some discrimination.

The following very general notes on each individual stock may be some guidance when these questions of discarding are raised:

*No. I. True *Broadleaved English Paradise* (Rivers) we consider well worth propagating as ideal stock for poor soils, weaker varieties such as Lanes, and very strong bush trees, often requiring to be planted 30 feet apart.

*No. II. True *Doucin*—often sold as "English Paradise"—we consider the best at the moment for the general run of bush trees which are wanted to crop fairly quickly and serve as "fillers," though trees on this stock may reach considerable size.

It seems ideal for such varieties as Cox's, Worcester, Allington, etc., but is often unsuitable on "scorchy" soils and with weak varieties.

No. III. ("Hollyleaf" of Malling) too weak, mildewy, knotty, and suckery to be worth carrying on—frequently mixed with continental Doucin.

No. IV. *Holstein Doucin* ("Dutch")—yellow wooded, not infrequently coming from continent wrongly named as Jaune de Metz (No. IX.).

An unsatisfactory stock, first, because it does not bud well, and second, because it is so surface rooting that trees on it blow over readily. It makes very large trees which crop freely even in early years, but we think must be condemned for foregoing disadvantages.

No. V. *Doucin Amelioré* of France—so-called Improved Doucin of this country and "Red Paradise" of Holland and Germany. It is beautifully clean to work and much better rooted off the stool than No. 2; but we recommend everyone to beware of it. Even early in life trees worked thereon become badly leaf scorched, and they do not crop as early as on true Doucin. Neither is it so healthy in the nursery. Unfortunately a very large proportion of the so-called Doucin and English Paradise which is imported from the Continent consists mainly of this undesirable stock.

* These varieties are suggested as especially worthy of retention.

No. VI. *Nonsuch Paradise* (Rivers). As far as we can see this is no improvement over No. I. true Broadleaf. The stock is very swollen at nodes and so difficult to work. It is sappy and sometimes splits, and it does badly under dry conditions. We choose No. I. in preference.

†No. VII. *Unnamed.* If not so susceptible to Crown-gall, this stock would be most useful. It is beautifully clean stemmed, gives trees almost as vigorous as No. I., yet as early cropping as No. II., and exceptionally highly coloured fruit. But for its Crown-gall propensities, of which we warned people, it would be a really fine stock.

No. VIII. True *French Paradise.* Too weak to be any good in our climate. Stools die out with Scab, Canker and Mildew very quickly. It is frequently mixed in with imported "Doucin."

*No. IX. *Jaune de Metz Paradise* (Dieudonné). Healthy, though only giving a few layers to a stool. There is no stock which approaches it for causing early cropping—even varieties like Blenheim making fruiting cordons in three years. We think it well worth growing for cordon and small dwarf Garden and filler trees of selected varieties.

Though its roots are brittle, it quickly recovers after lifting, *if well done.*

No. X. *Unnamed.*—of German origin (Späth's seedling "Doucin" U.1) about as vigorous as No. I.—well rooted and anchored, gives exceptionally good trees of Lanes—and in some varieties, like Bramley, greatly reduces the lateral growths. Hardly worth multiplying commercially.

No. XI. *Unnamed*—of English origin (Malling Selection). Very similar to No. I., but liable to Woolly Aphis attack. It is the only Apple Stock which has produced a fruit of its own worth eating—and is a fine late keeping apple of good flavour and appearance.

*†No. XII. *Unnamed*—of English origin (Malling Selection). The most vigorous of all our *layered Free Stocks.* It produces immense, well anchored trees—very saleable in appearance and very slow to crop—and is suitable for standard trees. We consider it a bit too vigorous for most purposes.

*†No. XIII. *Unnamed*—of German origin (Späth's Seedling "Doucin U.2") Another *layered Free Stock.* Usually intermediate between No. I. and No. XII. It produces good well anchored standards, with slight tendency to spreading roots. It comes into cropping more quickly than No. XII., it is very easily propagated vegetatively, but is possibly "thin" barked.

* These varieties are suggested as especially worthy of retention.

† Signifies that these deserve further trial.

No. XIV. *Unnamed*—of German origin (Späth's Seedling "Doucin U.5"). About as vigorous as No. I., but with nothing very special to recommend it.

*†No. XV. *Unnamed.*—of German origin (Späth's Seedling Doucin U.6). An extremely hardy and robust *layered free stock*, the only disadvantage being "spiny" habit of growth. It produces vigorous well anchored trees making excellent standards, and showing signs of cropping more quickly than Nos. XII. and XVI.

*†No. XVI. *Unnamed*—of German origin (Späth's Seedling Doucin U.3). Another very hardy *layered Free Stock.* Though not appearing extra vigorous in the stool beds, it grows clean, takes the bud well and produces most vigorous well anchored trees, which although slow to crop show more promise of fruiting than No. XII. To all appearances it is an admirable stock for standard trees.

Since the above Stocks were identified and described in 1917, numerous other so-called "Paradise" have been found in Commercial circulation from time to time. At the moment, none of these appear to warrant description or multiplication for trial.

It is possible that a few Nurserymen may be in possession of "Crab A," "Crab C" or "Crab F"—all Malling selections, propagated vegetatively from promising individuals found in a bed of seedling crabs.

All these three selections have proved easy to raise from layers and they have produced fine young standard trees, of considerable promise.

East Malling does not claim to have introduced sixteen varieties of "Paradise" Stocks, but strongly advocates a reduction of the number at present in commercial use, by the discarding of the great majority.

A word might be added with regard to the extent to which the so-called Paradise Stocks were intermixed. Ten years experience of the roguing of commercial stool and stock beds and the identification (for Nurserymen) of hundreds of samples of stocks, has not confirmed the deduction that the majority of stool beds were unmixed. Although our first report in 1917 showed that only 36 per cent. of the collections sent in were mixed and 66 per cent. properly named, it must be remembered that these collections were especially sent in by invitation as true samples for experimental purposes. Even varieties such as Nonsuch and Doucin were sent in under many different names.

To-day the record of stool beds in this country is on the whole a very different one, but the majority of continental samples unfortunately, show no such evidence of improvement, rather the reverse.

* These varieties are suggested as especially worthy of retention.
† Signifies that these deserve further trial.

Part II

Physiology.

Part II

PHYSIOLOGY.

1. Water Relations of Apples.

There appears to be some correlation between the conductivity for water of the stems of stocks and that of the stems of scions worked on them. Of the stocks so far tried Type II. shows the lowest conductivity, whilst Bramley's Seedling on Type II. also gives lower conductivity than the same variety on Types I. and IX.

2. Propagation.

(*a*) *Hardwood Cuttings.*

A further season's results have supplemented the data previously obtained and a report has now been published.

(*b*) *Softwood Cuttings.*

This work has reached a stage which justifies publication and a report is in the press. The greatest success has been obtained with stems not in active growth planted early in the year. Sand is not always the most suitable substratum. Etiolation of the bases of the stems improves rooting.

3. Field Experiments.

The figures obtained this season from the " multiple budded " and double-worked trees confirm the indications given by last year's measurements. The introduction of two or three buds (instead of only one) into a stock of Type I. or Type IX. increases the number of fruit buds per metre of wood growth, the effect being greater on Type IX. than Type I. In the case of the double-worked trees, when Type IX. is the intermediate, the result is the development of less vegetative and more reproductive growth than when Type I. is the intermediate. A second series of trees is in preparation.

4. Growth.

A report on the close correlation between new shoot growth and the thickening of old stems is in the press.

Part III

Plant Pathology.

Part III

PLANT PATHOLOGY.

1. Crown Gall and "Burr-knots."

The results of observations and experiments on Burr-knots of fruit trees, showing that the knots have no connection with Crown-gall, have been written up and published in the Journal of Pomology.

2. Brown Rot.

(1) Strains of Brown Rot fungi from various hosts are being compared morphologically and biologically.

(2) The results of ten years' study of strains obtained from abroad, with the object of determining the distribution of the Brown Rot fungi, have been submitted for publication in the Annals of Botany. The outstanding features of this report are (*a*) *Sclerotinia fructigena*, the commonest cause of fruit rot in Europe, is unknown in North America, Australia and New Zealand. (*b*) The cause of Brown Rot in Australia and New Zealand is *Sclerotinia americana*, which is the chief cause of Brown Rot in North America; this species has not been found in Britain.

(3) Experiments have been made to determine whether strains of *Sclerotinia cinerea* from cherry and plum can cause Blossom Wilt of the Fertility Pear. In one case the typical wilt was obtained by inoculation with a cherry strain.

(4) Experiments to ascertain the mode of infection of plum stool shoots by *S. cinerea* have been carried out, but up to the present with indefinite results.

(5) Further inoculations have been made on Morello cherry flowers to obtain information on the mode of infection.

(6) The results of observations on the leaf-blotch of Quinces caused by *Sclerotinia cydoniæ* have been published in the Transactions of the British Mycological Society.

3. Effect of Root Stock on the Susceptibility of the Scion.

Observations have been continued relative to the following diseases :—

(1) *Apple Mildew.* Further records on varieties on different stocks have been taken and although the results have not yet been analysed in detail, there are indications of real differences in susceptibility induced by the stock.

(2) *Apple Scab.* Observations are being taken upon Cox's Orange Pippin on different root stocks, and the first season's figures show a marked difference in susceptibility according to the stock.

(3) *Apple Canker.* Field observations suggested that certain stocks render the scions grafted on them more susceptible to Canker than others. Direct inoculation experiments, made by inserting the fungus into wounds on a variety on two different stocks, gave rise to similar infection in all cases and the results therefore offer no evidence that suceptibility is modified by the stock when the trees are directly infected through wounds.

(4) *Die Back of Plums.* A careful analysis of the incidence of this disease upon six acres of plums upon various root stocks has shown that, whilst scion varieties differ markedly in susceptibility, root stock does not appear to modify the degree of infection.

4. Raspberry Diseases.

(1) *Blue Stripe Wilt.* The fungus (a species of *Verticillium*) causing this disease is being compared with species of the genus causing wilts in other crops, and experiments have been initiated to ascertain whether the fungus is capable of attacking other crops.

(2) *Cane and Leaf Spot.* Inoculation experiments using pure cultures of the fungus associated with this disease have given positive results; this, together with observations on the life-history and morphology of the organism, offers evidence of the identity of this disease with "Anthracnose" of *Rubus* spp. in America. Spraying experiments for the control of this disease have been started, and the first year's results indicate the lines along which success may be hoped for.

(3) *Mosaic.* Preliminary experiments have been carried out with the primary object of ascertaining whether this disease is one of the "Virus" diseases; the results have shown that (in common with certain mosaic diseases in other plants) it can be transmitted by grafting.

Field work on the three diseases above mentioned have been continued to determine (*a*) the relative susceptibility of the various varieties of raspberries in common cultivation (*b*) means of raising and maintaining disease-free stocks.

A popular description of these diseases has been published to enable growers to identify them and certain control measures based on results already obtained have been recommended.

(4) *Spur Blight.* Preliminary observations have been made on a disease which has features in common with a disease known in America as "Spur Blight."

5. Bacteriosis of Plum and Cherry Trees.

(1) *Bacterial Shoot Wilt of Plums.* Further cultural and inoculation studies have been made with the organism causing this disease.

(2) *Leaf-spot and Gummosis of Cherries.* Inoculations with an organism isolated from a leaf-spot have given rise to typical spotting of the leaves and to gummy lesions on the branches.

(3) *"Die-back" of Plum Trees.* An organism, found associated with cankered areas on the stems of dying plum trees, has been isolated, and inoculation experiments on young shoots and fruit have given rise to bacterial lesions thus showing its pathogenicity. Inoculations on older branches and stems are under way. This organism shows cultural characters different from those shown by the bacteria mentioned under (1) and (2) above.

6. Canker in Fertility Pear Trees.

Observations have been made on Pear Canker following an attack of Scab. The results have been written up and accepted for publication in the "Journal of the Ministry of Agriculture."

7. Hop Diseases.

(1) *Leaf-spot.* A further study of the mode of infection by *Cercospora cantuariensis* has been made.

(2) *Hop Wilt.* Inoculation experiments with the species of Verticillium associated with this disease have so far given negative results on hops but the fungus has been found to cause a wilt when inoculated into potato haulms.

8. Walnut Bacteriosis.

A leaf-spot found on a young tree on a variety of Walnut included in the trials at East Malling has been found to be caused by a bacterium. The organism has been isolated and inoculation experiments have given positive results. Preliminary studies of the disease suggest that it is "Walnut Blight" which is a serious disease of the foliage and fruit of this host in America.

9. Apple Spraying Field Trials.

Spraying trials, using various fungicides, against Scab and Mildew with special reference to the varieties Cox's Orange Pippin and Stirling Castle have been started on a plot of these varieties worked on known stocks. The physiological as well as the fungicidal effects upon the tree are being studied.

Part IV

Entomology.

Part IV

ENTOMOLOGY.

Dormant Winter Wash Trials.

(*a*) In co-operation with Dr. Goodwin of the S.E.A. College, the testing of a proprietary brand of tar-distillate together with a similar wash of known composition has been repeated under laboratory conditions.

The washes applied at strengths varying from 5 to 10 per cent. caused a mortality of from 92 to 96 per cent. upon Vapourer Moth eggs. This trial confirms results obtained last year.

Further investigations on the control of Red Spider have been conducted both in the field and in the laboratory.

A new proprietary tar-distillate and a carbolineum of known composition were used in the trial. Both washes, gave negative results. The hatch in the controls varied from 88 to 95 per cent., while that of the treated eggs varied from 76 to 92 per cent.

(*b*) In collaboration with Messrs. Tattersfield and Gimingham, of Rothamsted Experiment Station, further field tests of some new washes have been made.

On the sprayed trees the per centage of Hop-Damson Aphis eggs killed varied from 58 to 75.

74 per cent. of the eggs on the control trees hatched. It is of interest to note that there was a 20 per cent. greater " hatch " than in 1925.

In connection with the above trial methods were tested for inducing artificial infections of insects on fruit trees, so that material for spraying may be available at will.

During the year nearly 80,000 eggs have been reared. These are available for spraying trials during the winter of 1926-27.

Study of Resistance of Different Varieties to Certain Insects Attacks.

(*a*) A number of Apple stocks of known origin, selected as being highly resistant to *Aphis pomi* De Geer, have been vegetatively propagated. After continued infections, both artificial and natural of the progeny of these stocks, it is found that in some the degree of resistance is maintained ; in others a marked degree of susceptibility has appeared. None of the stocks proved immune to aphis attack.

Some of these stocks showed a similar resistance to attacks of the Rosy Apple Aphis.

(*b*) The study of resistance of certain selected Mazzard Cherry Stock (*P. avium*) to Cherry Aphis (*Myzus cerasi*) has been continued.

Some stock maintained their resistance throughout the year. Others, which have appeared to be highly resistant during the past five years, in this season proved to be very susceptible to continued systematic infections.

(*c*) *Resistance to Woolly Aphis.* The work of testing the relative resistance both of the apple root stocks already in commerce and of the new seedlings being produced at the John Innes Institution has been carried to a point where it is possible to say that a number of new seedlings (the results of crossing Northern Spy with Doucin (II.) and Metz (IX.), have been selected because they show as high a degree of immunity as Spy itself. These are now being multiplied vegetatively. There is thus a real prospect of producing, at no far distant date, a range of immune root stocks.

A paper detailing these researches has been prepared.

APPLE SAWFLY.

Control.

(*a*) Preliminary *investigations on the control of the Apple Sawfly* have been carried out during 1926. *Spraying experiments*, in the field, have shown that it may be possible to achieve a large measure of control by the application of a wet arsenic spray.

It would appear that success will depend upon the time of application of the spray and the weather conditions during spraying. The trials will be repeated.

Life History.

(*b*) Some observations are being made on the life-cycle of the insect, under local conditions.

Larvæ have not yet been detected in the soil. In one orchard, apples on selected trees were counted, 80 per cent. were found to be attacked by Sawfly larvæ. Later in the season, an examination of the soil, in the vicinity of the chosen trees failed to reveal any larvæ.

SYSTEMATIC STUDY OF GALL MITES.

A systematic study of the Gall Mites (*Eriophyidæ*) has been continued.

A collection of about sixty species has been obtained from various parts of the country.

So far fifty of these have been named on the characters of the mites themselves. The remainder will be dealt with as time permits.

The life histories on some species of economic importance is being followed up.

During the year the life cycle of the Raspberry Bud Mite has been investigated, and a report is now ready for publication.

Treatment of Mite Infected Cuttings.

It has been arranged to collaborate with Long Ashton yet another season before publishing results.

Direct Infection of Black Currants.

Evidence has now been accumulated which is very definitely in favour of the supposition that the Big-Bud Mite is a cause of the transmission of reversion. Healthy Black Currant bushes have been directly infected with it in order to test whether a new species of Mite (*Phyllocoptes spec.* Nal), is also a carrier of the disease.

Raspberry "Mosaic."

Investigations on the possible causes of transmission of these diseases are being continued.

Direct infections of healthy raspberry plants by the Raspberry Aphis have been undertaken. The plants contained in specially designed insect proof cages have remained healthy throughout the year.

See also Pathological Section.

THE CONTROL OF THE APPLE BLOSSOM WEEVIL.

(*Anthonomus pomorum* L.Curt).

A SUMMARY OF RESULTS.

By A. M. Massee.

The damage caused by this insect popularly known as *The Apple Blossom Weevil* was recognised by Fruit Growers in this country as far back as 1800, and it was in fact described as being an Apple pest at that early date.

This Weevil is distributed in most parts of England and Wales, and it occurs in Scotland and Ireland.

It is also a familiar insect in most European countries, more especially in France, and in that country it is even more destructive than it is in the British Isles. In France it attacks the pear tree on a considerable scale as well as the apple, whereas in this country its activities are mainly confined to the apple tree.

The Weevil seems to have spread more rapidly in cultivated apple plantations during the past twenty years or so, for in some of the older records, the weevil is described as being local, or uncommon in the large fruit growing areas such as are found in Kent.

The natural host plant of this Weevil is doubtless the Wild Crab Apple, and it is still to be found in considerable numbers on that tree. In fact isolated crabs growing in hedges or woods are frequently attacked by this pest.

Life-History of Weevil.

The Weevils appear in the Spring, usually during the first spell of warm weather. They crawl or occasionally fly up to the branches of the apple trees, and there copulation takes place. They remain on or in the vicinity of the trees waiting for the buds to develop. When the buds are developing the adult female weevil selects a flower bud and proceeds to bore a small hole in the unopened flower. The weevil then lays an egg in the hole, which is afterwards sealed up.

The number of eggs deposited by each female varies according to the season. A single female may lay as many as 150 eggs. Generally speaking only one egg is deposited in each blossom.

The weevils lay many more eggs in a season when the opening of the blossoms is retarded by a continuous spell of cold weather. On the other hand, when the blossom period is reduced by a continued spell of warm weather, the weevil is unable to lay all her eggs before the flowers open.

The eggs hatch after a period of from five to ten days, and the grubs or larvæ at once commence to feed upon the stamens of the flowers. The blossoms continue to expand, but the petals rarely develop or open. As a rule they partly

dry up and turn brown in colour. These malformed flowers are frequently referred to as *Capped Blossoms.*

The length of life of the maggot varies very considerably. Sometimes it is fully developed within eight days, at other times it may extend over a period of three weeks.

The maggot changes into the chrysalis stage within the *Capped Blossom.* It remains in the chrysalis stage for a period of from one to two weeks.

Soon after the adult weevil has hatched from the chrysalis, it eats its way out of the "*Capped Blossom*" and then rests for a short while on the tree. The weevil then feeds on both surfaces of the apple leaves for some days, and finally it seeks shelter until the following spring, in cracks in the bark, in wounds on the stem, in rubbish or leaves under the trees, and in some instances in the soil.

Methods of Control.

A large number of research workers have been engaged in the problem of controlling the *Apple Blossom Weevil,* and various methods of control have been advocated. A few of the most important of these treatments will be referred to briefly.

The Use of Hens.

It has often been claimed that hens running about in plantations were a valuable asset in the control of *The Apple Blossom Weevil,* and at the present time growers frequently try to eradicate weevil by enclosing hens in their infested plantations.

However, it has been demonstrated very clearly that while hens will readily devour some species of weevils, such as the *Leaf Eating Weevil* and the *Raspberry Weevil,* they will not as a rule take readily to the *Apple Blossom Weevil* as food.

In one instance pullets that were generally sparingly fed were given *Apple Blossom Weevils* as food; with a single exception they did not take to the weevils, but went on searching for other animal life in the soil.

The Jarring and Grease Banding of the Trees.

There is apparently a common belief that the weevils, especially the females, rarely if ever use their wings. On this assumption it is thought that the weevils should be trapped on their way up the trunk of the trees by effective grease bands.

It is now definitely established that the weevils do fly readily on warm sunny days. Further it has been shown in experiments that very few weevils are ever caught on the grease bands, and the practice is not to be recommended for controlling this pest.

The method of jarring the trees, or severely shaking the branches in the hope of dislodging the weevils, and then catching them on their return journey up the trunk has been advocated and tried out in the past, but as already mentioned, the weevils are not caught in any number on their way up the trunk, and therefore this treatment is useless for their control.

Lime Washing and Arsenical Sprays.

The application of a hot lime wash during the latter part of March or early April has been recommended from time to time as a measure for controlling the *Apple Blossom Weevil.*

However, the experience of East Malling does not seem to justify the use of a lime wash.

Observations were made on an apple orchard that was thoroughly sprayed with a hot lime wash during March, and it was found that many weevils thoroughly coated in lime were still very active, and were actually observed to be laying their eggs in the normal manner. These lime-coated weevils were seen as late as the end of June, over three months after the application of the lime.

Here it should be emphasised that it does not mean that lime washing may not be a commercial proposition as a general late dormant wash where the trees are old or neglected.

The practice of spraying apple trees in the spring with an arsenate of lead spray, in order to poison the weevils, whilst they are eating their way into the unopened flowers, previous to laying their eggs, has been tested in the field. The results of this trial were disappointing, since the majority of the weevils remained alive on the trees after the application of the spray. It is well known that the weevils feed on the leaves of the apple before and after laying their eggs, and it is therefore not quite clear why an application of lead fails to control the pest to some extent.

Trapping Methods: Sacking Bands used as a Means of Collecting Weevils when they go into Hibernation.

A series of experiments have been carried out at East Malling over a number of years, and it has been found that the Apple Blossom Weevil is most readily controlled, under our conditions by trapping it in sacking bands.

Manipulation of Sacking Bands.

Discarded bags (*old sacking or bags which originally contained meal or other artificials are equally effective*) are cut up into long strips, the width of the strips being about 6 inches. Each strip is then cut in length so that it will be at least

twice that of the circumference of the tree. The sacking is then folded in the middle so that it will be of double thickness. Figure I. illustrates method of folding sacking. The double thickness of the band allows the free entrance of the weevils both from above and below the tie, which should be made in the centre of the band (See Fig. II).

Position of Bands on Trees.

The position of the bands on the trees makes the whole difference between success and failure. Wherever possible the bands should be placed so that the base is about twelve inches above ground level. Fig. II. illustrates a sacking-banded apple tree.

In the case of bush trees it is advisable to place the bands as near the fork of the branches of the trees as possible.

It should be pointed out that trees grown on a very short leg are much more difficult to band successfully.

Finally, it might be mentioned again that the kind of sacking used for trapping the weevils appears to be of no importance, for instance, weevils seem to be attracted to old uncleaned guano bags to the same extent as new sacking.

Time of Putting on and Removing Sacking Bands.

With regard to the best time for the application of bands, it has been repeatedly demonstrated that the weevils seek shelter in the bands in largest numbers during June and July. *Therefore the bands should be applied if possible by the end of May.*

The question as to whether the bands should be removed from the trees at the beginning of August, after the influx of weevil during June and July, or whether they should be left on the trees until a later date, has been followed out, and it has been found that once the weevils enter the bands they remain there until the end of the year. It is evident therefore that it is safe to leave the bands on the trees until late in the year, *and the best time for their removal is during the months of December or January.*

Treatment of Bands after Removal from Trees.

If it is intended to repeat the banding the following season, and the sacking is considered good enough for use a second time, it can, immediately after removal from the tree, be thrown into a tub of water with a few stones to sink it and prevent it floating. A film of paraffin is then poured on the surface of the water, and this will ensure the destruction of the weevils. When it has been ascertained that the weevils are dead, the tub can be emptied, the strips of sacking dried, and used again the following May.

When the banding is only carried out on a small scale, or in cases when it is not going to be repeated the following year, it is best to burn the sacking directly it is removed from the trees.

Insects other than Apple Blossom Weevils found in Bands.

Many other species of insects are found in the bands during the summer and winter months.

For example, Earwigs are very common in the summer months, and when it is very warm great quantities of Rosy Apple Aphis shelter in the bands. In the spring, the Clay Coloured Weevil is found in the bands in considerable numbers.

Other Weevils belonging to the same genus as the Apple Blossom Weevil are also frequently found in the sacking. Various caterpillars are also present at different seasons, and in some instances they pupate in the folds of the sacking.

The writer is indebted to Mr. W. Steer for the illustrations.

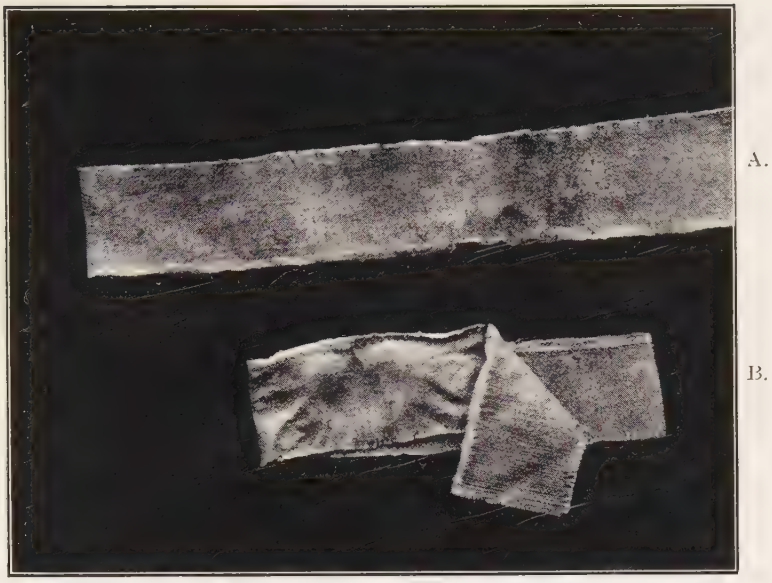


FIG. 1. Illustrating the method of folding the sacking-bands.
B. shows method of folding sacking prior to placing around tree trunk.

FIG. 2. A sacking-banded Apple Tree.
(Note : The band here is placed at correct height.)

Part V

Hops.

Part V

HOPS.

The extended programme of Research adopted by the Hop Sub-Committee in January is given below in full. Since that date much of the work has already been put in hand.

1. Cropping Trials of Commercial Varieties.

(*a*) Preliminary collections having been got together and crop weights kept for several years, these trials indicate the possible selection of some and *exclusion* of other varieties (except as reference specimens) under our conditions.

(*b*) Since it has been revealed that many commercial stocks are both mixed and mis-named, it is proposed to raise *"clone" families (from single parent plants) of the principal varieties for further field testing*, i.e., simultaneous planting out, in re-duplicated plots of at least sixty hills of each variety.

(*c*) The product of these sixty hills would be offered to the Institute of Brewing *for definite brewing trials*, as well as analyses, etc., and should afford on the average at least 1 cwt. of dried hops of any variety.

(*d*) *Systematic descriptions* to be made of the principal varieties with a view to *establishing easy methods of identification* both *in the field*, and *under dried conditions* on the market. The classification work should precede the ultimate trials.

(*d*) *Possible selection of Strains* of particular varieties such as different types of Fuggles, Bramlings, etc., with a view to comparing their performance under similar conditions.

This work would of course be co-ordinated with the testing of Professor Salmon's new seedlings.

2. Foreign Varieties.

Most of the Foreign Varieties which have been grown at East Malling for purposes of comparison (under similar conditions) with Professor Salmon's seedlings, have proved unadaptable, and can therefore be discarded. It is not proposed, for the present, to attempt any systematic classification of these varieties, since it would involve periods of study under their natural conditions on the Continent, etc.

Since all these varieties are collected in a Museum at Wye, there is no need for Malling to retain them even as specimens.

3. Testing New Seedling Varieties.

The most happy collaboration with Professor E. S. Salmon of Wye is to be maintained, and the trials extended.

Under this arrangement the best of Professor Salmon's new varieties are tested under conditions very different from those at Wye, and thus one of the first essentials in the trial of new seedlings—adaptability to different soil conditions—is ensured. East Malling will continue to grow these seedlings under commercial conditions, to take the necessary records of green and dry weights, etc., and provide the required samples for judging and analyses.

This portion of the work now falls conveniently into two sections.

(*a*) The continued testing of seedlings from the S.E.A. College already established at Malling.

(*b*) The testing of any future selections that may be sent for trial.

(*a*) Up to the end of 1924, there have been planted for trial (usually thirty hills), 155 female varieties of seedlings. Of these approximately twenty-four have been already discarded for various reasons. About 130 seedling varieties are therefore still in the trial gardens. Of these, a few have not yet been sufficiently tested, owing to the very limited number of hills, and their recent introduction. However, the great majority have now had crop weights taken for three or four years, together with notes upon other characteristics, and resin analyses made, through a grant from the Institute of Brewing. It has been possible from amongst these to pick out some thirty varieties with certain outstanding features to recommend them to the Grower or Brewer for further testing.

It is suggested that the time has come for a very critical selection of such varieties to be made with the object of increasing the number of hills of the best, and at the same time of planting, for comparison, a few representative commercial varieties for a more exhaustive trial.

These additional rows should afford a more strict basis from which to draw comparisons, and, with the original rows, would give a sufficient quantity of hops to allow of the drying of a really marketable quantity for the Brewers to test. At the moment one of the chief difficulties in estimating the preservative value of the hop is due to the fact that the method of analyses is now undergoing a change—a biological analysis—being substituted for a chemical one. However, until a sufficient quantity has been grown, the proper market value cannot satisfactorily be tested. Moreover, if these varieties are to be introduced to commerce, there must exist adequate sources from which they can be reproduced.

Of the remainder, many could be dispensed with entirely from the East Malling Gardens, whilst others, until methods of evaluation have become more stable, could be retained temporarily without having their performance recorded in detail.

(*b*) As before, the trial of new selections will probably have to take much the same form as the earlier ones, a series of preliminary testings and a final selection for ultimate trial. But it is suggested that new selections should only be planted out in batches and when a minimum of, say, thirty sets of each is available. (It would be ideal, if at the same time, thirty comparable sets of a chosen standard commercial variety of similar season could be planted with them as controls).

4. Male Hop Sets.

Selections should finally be made from those *male* hills *showing apparent immunity to " Mosaic " disease* in the Malling Gardens, in order that, if possible, say, two earlies, two mid-seasons and two lates, may be propagated in quantity for distribution to Growers. If possible a similar series of " mould immune " males should be selected.

5. Manurial Experiments.

The Manurial Experiments in the field, the detailed scheme of which is set forth in our last Annual Report, will be continued for a series of years, and it is much hoped that Mr. Burgess of Wye, will continue to help us from the chemical standpoint. It is proposed to offer samples of Hops from these plots, so variously manured, to the Institute of Brewing for experimental purposes. They are also being submitted to judges.

It is proposed to supplement the present Field Trials by a series of Pot Experiments.

Hops will be grown in pure sand cultures and fed with various complete and incomplete nutrient solutions. The primary object of this experiment is to show the behaviour of the Hop Plant when it experiences actual deficiencies and is starved of certain constituents. This may ultimately be of assistance in studying appearance in the field. The following treatments are suggested :

1. Complete nutrient solution.
2. Nitrogen omitted.
3. Potash omitted.
4. Phosphoric Acid omitted.
5. Calcium omitted.
6. Magnesium omitted.
7. Rain water only.

When the manifestations in the plants, resulting from certain deficiencies, have been studied, it is proposed to experiment with different ratios of the various constituents.

6. Cultural Experiments, etc.

After a review has been made of the results published from Wye by Messrs. Hall, Howard, Amos and others, it is felt that, whilst a number of their experiments have been quite conclusive, others on their own recommendation require duplicating under various soil conditions because results at any single centre can be of only very local application ; and still other aspects of cultural problems remain to be explored.

It would therefore be of much greater value if such experiments could be duplicated and collaborated both at Wye and East Malling.

It is suggested from East Malling that the following points might be worth consideration, amongst others, but East Malling would be willing to adjust its cultural programme to that of Wye, since it must be so patent to all Hop-growers that so many of the problems raised below can only produce results of purely " parochial " value, if they are not repeated at more than one centre over a series of years.

(i) Experiments on " Pulling."

(*a*) The *quality of the bine* left in relation to weight and season of crop produced.

(*b*) The *number of bines* ultimately left.

(*c*) The Method of " *Pulling* " i.e., relative severity at each operation.

(*d*) The alternative of *hard* and *late* " *cutting* " would be investigated in this respect.

(*e*) Varietal differences in these respects.

(ii) " Training."

(*a*) The *optimum height* for " carrying " *different varieties*.
In this connection, the stopping of leading growth would be tried.

(*b*) " *Stripping* " methods. Investigations into the time and degree over a period of years. (From complete stripping to suppression of side laterals only).

(iii) The Best Distances apart for Planting in Relation to Different Varieties to be Investigated.

In all this series of experiments it is proposed to work with, say, three of Professor Salmon's New Seedling Varieties together with our best local hop—Tutsham. We can find the necessary varying degrees of vigour, etc., amongst Prof. Salmon's Varieties, and we should get to know more about them, and produce them in quantity.

(iv) Duplication of Hall's Cultivation Experiments to elucidate optimum Depth and Nature at Various Seasons.

The old practice of "moulding" might also be compared.

These trials will be laid down and conducted over a series of years as the material becomes available, and the possible effect of various treatments upon resin content and appearance could also be observed.

Part VI

Meteorological Observations.

Part VI

METEOROLOGICAL OBSERVATIONS.

By H. C. CHAPELOW and H. M. TYDEMAN.

Weather Conditions during 1926.

The year 1926 has been upon the whole a fairly mild one. While sunshine was slightly deficient, rainfall was considerably in excess of the normal. The average daily sunshine only exceeded the normal during one month, August; May was over two hours below the average. With regard to rainfall, the month of November stands out as one of the wettest within recent years.

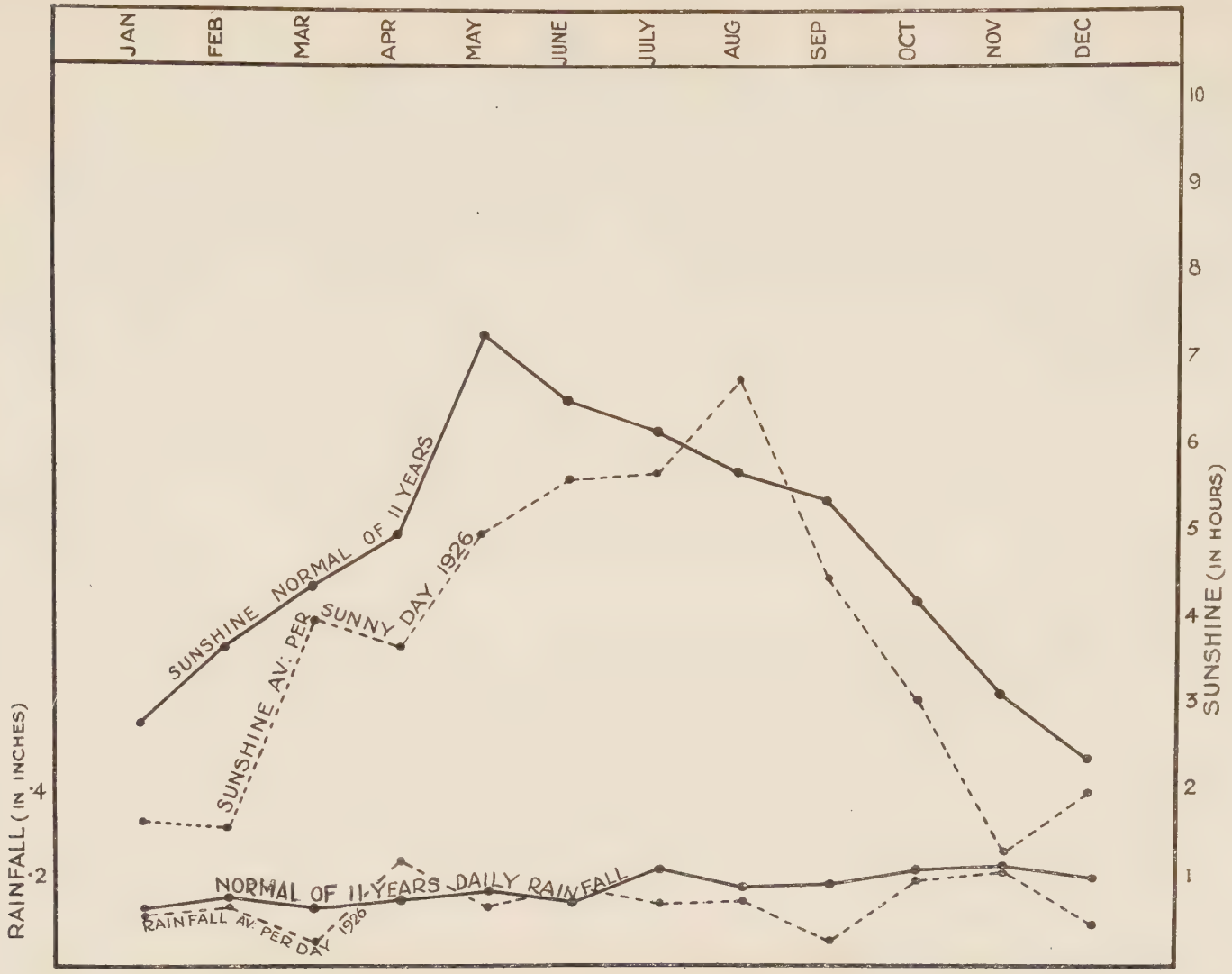
Conditions during the blossoming period were wet and cold and all but the earliest varieties of Cherries and Apples suffered considerably in consequence. The first few days of April were extremely mild and summerlike, and favoured the development of the blossom. In the case of Plums all varieties were in full blossom together within a few days, during this ideal period, and a heavy crop was the result. The same may be said of the earlier varieties of Cherries and Apples. Later varieties, however, after having been somewhat forced into blossom were met later by uncongenial conditions, and poor crops in many cases resulted. During the forty-four days in which Lane's Prince Albert Apple was blossoming, 6.33 inches of rain (or 0.14 inches per day) was recorded, while the mean temperature fell from 58 degrees on April the 3rd, to 41 degrees on the 11th.

The total rainfall for the year was 27.3 inches, 2.3 inches in excess of the average.

Sunshine during the year reached an aggregate of 1382.3 hours, which was twenty-four hours in defect of the normal, and more than 200 hours less than the previous year's total. With regard to temperatures, the sequence through the year was somewhat curious. While they were slightly below the normal during the first six months of the year, they were slightly above it during the latter six months. Nevertheless, pronounced departures from average conditions were rare, and the year was, upon the whole, fairly typical with regard to temperatures. The Autumn, however, was distinctly mild, especially with regard to grass minima, and soil temperatures.

Only thirty-three ground frosts occurred during the last three months of the year as against forty-nine in the previous year (a somewhat severe one in this respect), and, moreover, such frosts as did occur were by no means of so severe a character.

Table showing SUNSHINE & RAINFALL during 1926 (Average per sunny or rainy day) compared with previous TEN YEAR Average.



SUMMARY OF METEOROLOGICAL CONDITIONS DURING 1926.

	Barometer.	Temperature in Screen.					On Grass.		No. of Fronts.	Rainfall.				Sunshine.			Hygrometers.			Wind.
	Mean Reading.	Mean maximum.	Mean minimum.	Highest.	Lowest.	Mean.	Mean.	Lowest.		Total (ins.)	No. of days.	Av. per rainy day.	Heaviest fall in a day.	Total hours.	No. of sunny days.	Av. per sunny day.	Mean of dry bulb.	Av. deprec. of wet bulb.	Av. humidity. %	Direction.
January ..	29.806	45.1	33.7	52	13	39.4	29.5	11	16	2.46	20	0.123	0.51	52.5	18	2.9	39.0	1.0	91.3	S.W.
February ..	29.785	50.4	39.8	58	24	45.1	36.9	21	3	2.48	18	0.138	0.63	46.5	19	2.4	44.1	1.0	91.5	W.S.W.
March	29.970	50.9	37.4	61	27	44.1	32.8	20	13	0.38	7	0.063	0.08	126.8	29	4.4	44.4	2.8	77.5	W.N.W.
April	29.843	56.4	40.6	71	30	48.5	34.4	21	11	4.77	20	0.24	0.78	110.4	25	4.4	50.1	3.0	79.9	N.W. & S.W.
May	29.805	58.0	44.0	75	30	51.0	37.6	23	8	1.86	13	0.14	0.38	156.0	29	5.4	53.0	4.0	74.6	S.S.W.
June	29.847	64.5	48.1	73	40	56.3	44.7	35	0	2.64	15	0.18	0.48	169.7	28	6.0	58.7	4.1	76.5	S.S.W.
July	29.948	71.1	54.1	84	46	62.6	50.1	39	0	1.71	11	0.16	0.37	177.2	29	6.1	64.0	4.4	77.3	N.E. & S.W.
August	29.989	71.0	52.5	79	43	61.7	47.5	37	0	1.32	9	0.15	0.34	209.9	30	6.9	63.9	4.6	75.3	W. & W.S.W.
September ..	30.041	68.9	50.6	84	33	59.7	47.0	28	2	0.67	10	0.07	0.18	135.9	28	4.8	61.8	4.0	80.0	W. & W.S.W.
October ..	29.836	54.6	39.1	70	25	46.8	35.6	20	9	2.46	12	0.20	0.46	96.5	25	3.8	47.7	2.4	80.0	N.N.E. & W.S.W.
November ..	29.588	50.1	39.0	56	26	44.5	35.5	21	9	5.81	26	0.22	1.10	38.3	18	2.1	44.5	1.3	90.7	S.S.W. & W.S.W.
December ..	30.204	43.6	35.5	50	28	39.5	32.1	21	15	0.74	9	0.08	0.22	62.6	22	2.8	39.1	1.7	84.8	E.N.E. & N.W.

LIST OF PUBLISHED REPORTS TO 31ST MARCH, 1927.

To be obtained from:—THE SECRETARY, EAST MALLING RESEARCH STATION, EAST MALLING, KENT.

N.B.—The reports issued during 1926-7 are indicated by an asterisk(*).

	TITLE.	JOURNAL OF PUBLICATION.	REPRINTS.
	POMOLOGY.		
	Top Fruits.		
	Root Stocks.		
E1.	Paradise Apple Stocks. By R. G. Hatton.	Journal of Royal Horticultural Society, Vol. xlii., Part 2 and 3, p. 361, September, 1917.	Out of print.
E2.	Paradise Apple Stocks. Their Fruit and Blossom described. By R. G. Hatton.	Ditto, Vol. xliv., p. 89, May, 1919.	Ditto.
E4.	Suggestions for the Right Selection of Apple Stocks. By R. G. Hatton.	Journal of Royal Horticultural Society, Vol. xlv., Parts 2 and 3, p. 257, July, 1920.	Ditto.
E5.	A First Report on Quince Stocks for Pears. By R. G. Hatton.	Journal of Royal Horticultural Society, Vol. xlv., Parts 2 and 3, p. 269, July, 1920.	Ditto.
E9.	Results of Researches on Fruit Tree Stocks. By R. G. Hatton.	Journal of Pomology, Vol. ii., No. 1, pp. 1-10, November 1920.	Ditto.
E6.	Stocks for the Stone Fruits. By R. G. Hatton.	Journal of Pomology, Vo. lii., No. 4, pp. 209-245, August, 1921.	Price 1s. 6d., postage 3d.
E8.	The Importance of Suitable Stocks in Planting Young Fruit Trees. By R. G. Hatton.	Journal of the Kent Farmer's Union, Vol. x., No. 3, p. 82, September, 1921.	Out of print.
E10.	The Influence of Root Stock upon the Tree Fruits. By R. G. Hatton.	Fruit Grower, Vol. xvi., No. 1455, pp. 639-641; No. 1456, pp. 609-700; No. 1457, pp. 759-760; 18th and 25th October, 1923, and 1st November, 1923. Verslag Van Het International Tuinvouw-Congress, Amsterdam, 17th-23rd September, 1923, pp. 94-117.	Price 6d., postage 2d.
E7.	Some Notes on Stocks for Plums. By R. G. Hatton.	Journal of the Kent Farmers' Union, Vol. xiv., No. 5, p. 158, November, 1923.	Out of print.
E11.	Cherry Stocks; their Behaviour in the Nursery. By N. H. Grubb and A. W. Witt.	Annual Report of the East Malling Research Station, 1924, pp. 87-92.	No reprints.
E12.	The Choice of Young Fruit Trees. By R. G. Hatton, J. Amos and N. H. Grubb.	Journal of the Kent Farmers' Union, Vol. xvi., No. 4, pp. 132-134, October, 1924, and Annual Report of the East Malling Research Station, 1924, pp. 93-100.	Price 2d., postage 1d.

	TITLE.	JOURNAL OF PUBLICATION.	REPRINTS.
	Propagation.		
E3.	Summary of the Results obtained in Selection and Propagating Paradise Stocks. By R. G. Hatton.	The Fruit Grower, Vol. xlvii., pp. 1211-1212, February, 1919; Fruit Trades' Journal, Vol. xxxv., Nos. 7, 8, 9, February, 1919; Gardeners' Chronicle, Vol. lxv., Nos. 1677, 1678, 1679, pp. 71, 82, 100, February and March, 1919.	Out of print.
E13.	Some Problems of Propagation, Part I. By R. G. Hatton, J. Amos and A. W. Witt.	Annual Report of the East Malling Research Station, 1923, pp. 100-109.	No reprints.
	Pruning.		
EP1.	Results of Apple Pruning Experiments. By N. H. Grubb.	Journal of the Kent Farmers' Union, Vol. x., No. 4, p. 114, October, 1921.	Price 3d., postage 1d.
EP2.	Winter Pruning Experiments with Apple Trees. By N. H. Grubb.	Journal of Royal Horticultural Society, Vol. xlvii., Parts 2 and 3, p. 139, September, 1922.	Price 6d., postage 2d.
EP3.	Notes on Apple Pruning. By N. H. Grubb.	Journal of the Kent Farmers' Union, Vol. xiii., No. 3, p. 95, March, 1923.	Out of print.
EP4.	Apple Pruning. Summary of Deductions from Experiments at East Malling. By N. H. Grubb.	Journal of the Kent Farmers' Union, Vol. xviii., No. 5, pp. 150-154, November, 1925.	Price 2d.
*EP5.	The Pruning of Apple Trees. By N. H. Grubb.	Government of Northern Ireland Ministry of Agriculture's Leaflet No. 34.	Copies of leaflet to be obtained from the Secretary, Ministry of Agriculture, Wellington Place, Belfast.
	Miscellaneous.		
E15.	Some Factors Influencing Root Development. By R. G. Hatton, N. H. Grubb and J. Amos.	Annual Report of the East Malling Research Station, 1923, pp. 110-119.	No reprints.
E14.	Field Observations on the Incidence of Leaf Scorch upon the Apple. By R. G. Hatton and N. H. Grubb.	Journal of Pomology and Horticultural Science, Vol. iv., No. 2, pp. 65-77, January, 1925. Annual Report of the East Malling Research Station, 1924, pp. 41-53.	Price 6d.
E16.	Some Factors Influencing the Period of Blossoming of Apples and Plums. By R. G. Hatton and N. H. Grubb.	Annual Report of the East Malling Research Station, 1924, pp. 81-86.	Price 6d., postage 2d.

	TITLE.	JOURNAL OF PUBLICATION.	REPRINTS.
E17.	Apple Root-Stocks, their Particular Suitabilities for Different Soils, Varieties and Purposes. By R. G. Hatton.	Annual Report of the East Malling Research Station, 1925, pp. 45-52.	Price, 2d., postage 1d.
*E18.	Experiments upon the Removal of Lateral Growths on Young Apple Trees in Summer. By R. G. Hatton and J. Amos.	Journal of Pomology and Horticultural Science, Vol. vi., No. 1, pp. 61-71, Feb., 1927.	Price, 2d., postage 1d.
*E19.	The Influence of Different Root Stocks upon the Vigour and Productivity of the Variety Budded or Grafted Thereon. By R. G. Hatton.	Ditto, pp. 1-28, Feb., 1927.	Price, 5d., postage 2d.
*E20.	Root Stock Effect on Colour and Size of Apples (with Appendix describing Details of Experimental Colour Grading). By W. S. Rogers.	Annual Report of the East Malling Research Station (II. Supplement), 1925, pp. 16-32.	Price 6d., postage, 2d.
*E21.	Experiments with Double-worked Pears on Quince Stocks. By N. H. Grubb.	Ditto, pp. 11-15.	No reprints.
*E22.	The Incidence of Die-back Disease in Plum Trees on the Field. By J. Amos, R. G. Hatton and A. D. Mackenzie.	Ditto, pp. 33-37.	Ditto.
*E23.	Characteristics and Suitability of the so-called "Paradise" Stocks. By R. G. Hatton.	Annual Report of the East Malling Research Station, 1926, pp. 47-50.	Ditto.
	Small Fruits.		
Esf.1.	Black Currant Varieties—A Method of Classification. By R. G. Hatton.	Journal of Pomology, Vol. i., Nos. 2 and 3, pp. 68-80, 145-154, 1920.	Out of print.
Esf.2.	The "Running-Off" of Black Currants. By R. Wellington, R. G. Hatton and J. Amos.	Ditto, Vol. ii., No. 3, pp. 160-198, May, 1921.	Ditto.
Esf.5.	Black Currant Variety Trials: Reliability of Results. By R. G. Hatton, N. H. Grubb and R. C. Knight.	Journal of Pomology and Horticultural Science, Vol. iv., Nos. 3 and 4, pp. 200-220, June, 1925.	Price 6d.
Esf.3.	Commercial Raspberries and Their Classification. By N. H. Grubb.	Journal of Pomology and Horticultural Science, Vol. iii., No. 1, pp. 11-35, November, 1922.	Price 7d., postage 3d.
Esf.4.*a*	A Note on the Impurity of Raspberry Stocks. By N. H. Grubb and G. S. Peren.	Ditto, Vol. iii., No. 1, pp. 7-10, November, 1922.	No reprints.
Esf.6.	Raspberry Investigations. By N. H. Grubb.	Annual Report of the East Malling Research Station, 1923, pp. 128-130.	Ditto.
Esf.7.	Raspberry Varieties and Their Cropping. By N. H. Grubb.	Ditto, 1924, pp. 75-80.	Price 2d., postage 1d.
*Esf.8.	Some New and Old Varieties of Black Currant. By R. G. Hatton and J. Amos.	East Malling Research Station.	Price 2d. (including post.)

a Joint Publication with Long Ashton Research Station.

	TITLE	JOURNAL OF PUBLICATION.	REPRINTS.
	PHYSIOLOGY.		
F1.	The Carbohydrate-Nitrogen Ratio. By R. C. Knight.	Science Progress. Vol. xix., pp. 34-42, 1924.	No reprints.
*F2. & F3.	(combined). The Propagation of Fruit Tree Stocks by Stem Cuttings. Parts I. and II. By R. C. Knight and A. W. Witt.	Journal of Pomology and Horticultural Science, Vol. v., No. 4, pp. 248-266, and Vol. vi., No. 1, pp. 47-60, Oct., 1926, and Feb., 1927.	Price 6d., postage 2d.
*F4.	The Relation of the Apple between the Development of Young Shoots and the Thickening of Older Stems. By R. C. Knight.	Journal of Pomology and Horticultural Science, Vol. vi., No. 1, pp. 72-77, Feb., 1927.	Price 2d., postage 1d.
*F5.	Preliminary Observations on the Causes of Stock Influence in Apples. By R. C. Knight.	Annual Report of the East Malling Research Station (II. Supplement), 1925, pp. 51-63.	No reprints.
*F6.	Observations on the Water Conductivity of the Stems of Reverted Black Currants. By R. C. Knight.	Ditto, pp. 70-72.	Ditto.
	PATHOLOGY.		
C1.	Tests of Fungicides on Apple Trees. By N. H. Grubb.	Journal of Pomology, Vol. ii., No. 2, pp. 93-114, February, 1921.	Out of print.
C5.	Tests of Fungicides on Apple Trees—II. By N. H. Grubb.	Ditto, Vol. iii., No. 4, pp. 157-173, January, 1924.	No reprints.
C6.	Fungicidal Spraying of Apples. By N. H. Grubb and N. B. Bagenal.	Annual Report of the East Malling Research Station, 1923, pp. 120-124.	Ditto.
C7.	Experiences with Fungicidal Sprays. By N. H. Grubb.	Journal of the Kent Farmers' Union, Vol. ix., No. 5, p. 147, May, 1921.	Ditto.
C8.	The Spraying of Apples. By N. H. Grubb.	Gardeners' Chronicle, Vol. lxx., No. 1826, p. 326, December, 1921.	Ditto.
C3.	The Crown Gall Disease of Nursery Stocks—I. Field Observations on Apple Stocks. By H. Wormald and N. H. Grubb.	Annals of Applied Biology, Vol. XI, Nos. 3 and 4, pp. 278-291, October, 1924.	Ditto.
C9.	Notes on the Control of Nursery Stock against Crown Gall. By H. Wormald and N. H. Grubb.	Gardeners' Chronicle, Vol. lxxi., No. 1843, p. 198, April, 1922.	Ditto.
C17.	Field Observations on the Crown Gall of Nursery Stocks. By H. Wormald and N. H. Grubb.	Annual Report of the East Malling Research Station, 1924, pp. 122-125.	See C14.
C4.	The Blue Stripe Wilt of the Raspberry. By R. V. Harris.	Journal of Pomology and Horticultural Science, Vol. iv., Nos. 3 and 4, pp. 221-229, June, 1925, and Annual Report of the East Malling Research Station, 1924, pp.126-134.	Price 6d. See C14.

	TITLE.	JOURNAL OF PUBLICATION.	REPRINTS.
C10.	Raspberry "Mosaic." By N. H. Grubb and A. M. Massee.	Annual Report of the East Malling Research Station, 1923, pp. 131-133.	No reprints.
C2.	The Mulberry Blight in Britain. By H. Wormald.	Annals of Applied Biology, Vol. xi., No. 2, pp. 169-174, July, 1924.	Out of print.
C16.	Mulberry Bacterial "Blight." By H. Wormald.	Annual Report of the East Malling Research Station, 1924, pp. 120-121.	See C14.
C18.	An Unusual Form of Pear Canker. By R. V. Harris.	Ditto, 1924, pp. 135-136.	
C11	Note on the Bacterial Soft Rot of Turnips. By H. Wormald and R. V. Harris.	Annals of Applied Biology, Vol. xii., No. 3, pp. 326-329, July, 1925.	No reprints.
C15.	Notes on Plant Diseases in 1924. By H. Wormald.	Annual Report of the East Malling Research Station, 1924, pp. 110-119.	See C14.
	For Potato Spraying. See Field Trials.		
C12.	Parasitic Fungi of Cereals. By H. Wormald.	Farm Crops, Vol. I., pp. 318-336. 1925.	
C14.	Plant Pathology Section. By H. Wormald.	Annual Report of the East Malling Research Station, 1924, pp. 107-136.	Price 5d., postage 2d.
C13.	A Leaf Blotch of the Shasta Daisy. By H. Wormald.	The Gardeners' Chronicle, Vol. lxxviii., No. 2,027, Oct. 31st, 1925, p. 353.	Out of print.
*C19.	On the occurrence in Britain of the Conidial Stage of Sclerotinia Cydoniæ Schell. By H. Wormald.	Transactions of the British Mycological Society, Vol. X, Part IV. 25th February, 1926.	Reprints.
C20.	Three Raspberry Diseases. By R. V. Harris.	Annual Report of the East Malling Research Station, 1925, pp. 64-70.	Price 3d., postage 1d.
*C21.	On "Burr-Knots" of Fruit Trees. By R. G. Hatton, H. Wormald and A. W. Witt.	Journal of Pomology and Horticultural Science, Vol. v., No. 3, pp. 195-204, July, 1926.	Price 3d., postage 1d.
*C22.	Plant Pathology Section. By H. Wormald.	Annual Report of the East Malling Research Station (II. Supplement), 1925, pp. 75-96.	Price 6d., postage 2d.
*C23.	Notes on Plant Diseases in 1925. By H. Wormald.	Ditto, pp. 75-86.	See C22.
*C24.	A Leaf Blotch of Quince Trees. By H. Wormald.	Ditto, pp. 87-88.	See C22.
*C25.	Bacterial Rot of Turnips. By H. Wormald and R. V. Harris.	Ditto, pp. 89-91.	See C22.
*C26.	A Wilt Disease of Hops. By R. V. Harris.	Ditto, pp. 92-93.	See C22.
*C27.	The Grey Mould of Hops. By H. Wormald and W. F. Cheal.	Journal of Ministry of Agriculture, vol. xxxiii., No. 5, pp. 456-458, August, 1926, and Annual Report of the East Malling Research Station, (II. Supplement), 1925, pp. 94-95.	See C22.
*C28.	A Disease of the Shasta Daisy. By H. Wormald.	Ditto, pp. 96-97.	See C22.

	TITLE.	JOURNAL OF PUBLICATION.	REPRINTS.
	ENTOMOLOGY.		
D1.	The Control of the Apple Blossom Weevil. By A. M. Massee.	Journal of Pomology, Vol. iv., No. 1, pp. 24-37, July, 1924.	Price 5d.
D2.	Control of Apple Blossom Weevil. By R. G. Hatton.	Journal of the Kent Farmers' Union, Vol. ix., No. 6, p. 176, June, 1921.	No reprints.
D3.	Apple Blossom Weevil Experiments. By K. P. Worsley.	Journal of the Kent Farmers' Union, Vol. xii., No. 1, p. 30, July, 1922.	Ditto.
D4.	The Resistance of Apple Stocks to Attacks of the Green Apple Aphis. By A. M. Massee.	Journal of Pomology, Vol. iii., No. 4, pp. 191-200, January, 1924.	Ditto.
D5.	The Control of Big Bud Mite in the Field. By H. M. Tydeman.	Annual Report of the East Malling Research Station, 1923, pp. 125-127.	Ditto.
D6.	The Control of the Big Bud Mite in the Field. By R. G. Hatton, J. Amos and H. M. Tydeman.	Annual Report of the East Malling Research Station, 1924, pp. 158-160.	Price 2d., postage 1d.
D7.	The Leaf and Bud Mite of Raspberry. By A. M. Massee.	Journal of Pomology, Vol. iv., No. 1, pp. 59-61, July, 1924.	No reprints.
D8.	Abnormal Leaves of the Himalaya Berry and the Raspberry. By A. M. Massee.	The Gardeners' Chronicle, Vol. lxxii., No. 1872, p. 281. November 11th, 1922.	Ditto.
	Raspberry "Mosaic" (see Pathology Section.)	Annual Report of the East Malling Research Station, 1924, pp. 143-144.	Ditto.
D9.	Preliminary Field Trials of Tar Distillate Washes. By A. M. Massee.		
D10.	The Control of Black Currant Gall Mite. By A. M. Massee.	Annual Report of the East Malling Research Station. 1925, pp. 76 80.	Price 2d., postage 1d.
*D11.	A Quantitative Examination of the Toxicity of 3:5-Dinitro-O-Cresol and other Compounds to Insect Eggs, under Laboratory and Field Conditions. By C. T. Gimingham, A. M. Massee and F. Tattersfield.	Annals of Applied Biology, Vol. xiii., No. 3, August, 1926.	Reprints.
*D12.	Entomology Section. By A. M. Massee.	Annual Report of the East Malling Research Station, (II. Supplement), 1927, pp. 101-157.	Price 9d., postage 3d.
*D13.	Field Experiments with Dormant Winter Washes. By A. M. Massee.	Ditto, pp. 101-113.	See D12.
*D14.	Tar Distillate Washes. By W. Goodwin, A. M. Massee and R. H. Le Pelley,	Ditto, pp. 114-125.	See D12.
*D15.	The Transmission of Reversion. By R. G. Hatton, R. C. Knight and A. M. Massee.	Ditto, pp. 126-150.	See D12.

	TITLE.	JOURNAL OF PUBLICATION.	REPRINTS.
*D16.	Observations on the presence of Mites (Eriophyes Ribis) upon Black Currant Bushes manifesting Reversion and Big Bud. By A. M. Massee.	Ditto, pp. 151-152.	See D12.
*D17.	The Gall Mites of the Himalaya Berry and the Raspberry. By A. M. Massee.	Ditto, pp. 154-156.	See D12.
*D18.	Notes on Insects and other Pests, 1925. By A. M. Massee.	Ditto, 157-160.	See D12.
*D19.	The Control of the Apple Blossom Weevil. A Summary of Results. By A. M. Massee.	Annual Report of the East Malling Research Station (II. Supplement), 1926, pp. 66-70.	Price 2d., postage 1d.
	HOPS.		
B1.	First Report on Trial of New Varieties of Hops at East Malling. By Prof. E. S. Salmon.	The Research and Advisory Dept., S.E.A. College, Wye, January, 1918.	Out of print.
B2.	Second Ditto. By Prof. E. S. Salmon.	Ditto, April, 1919.	Ditto.
B3.	Third Ditto. By Prof. E. S. Salmon.	Ditto, April, 1920.	Price 6d., postage 2d.
B4.	Fourth Ditto. By Prof. E. S. Salmon.	East Malling Research Station, Kent, July, 1921.	Ditto.
B5.	Fifth Ditto. By Prof. E. S. Salmon.	Ditto, July, 1922.	Ditto.
B6.	Sixth Ditto. By Prof. E. S. Salmon.	Ditto, July, 1923.	Ditto.
B7.	Seventh Ditto. By Prof. E. S. Salmon.	Ditto, June, 1924.	Ditto.
B8.	‡Eighth Ditto. By Prof. E. S. Salmon.	Ditto, August, 1925.	Ditto.
B9.	Hop Experiments: The Testing of New Varieties of Hops. By R. G. Hatton and J. Amos.	Annual Report of the East Malling Research Station, 1924, pp. 169-175.	Out of print.
B10.	Manurial Scheme of Trials with Hops. By J. Amos.	Ditto, 1924, pp. 176-179.	No reprints.
*B11.	‡Ninth Report. By Prof. E. S. Salmon.	Ditto, August, 1926.	Price 6d., postage 2d.
	FIELD TRIALS.		
	Potatoes.		
G1.	Trial of Wart Resistant Potatoes. By R. G. Hatton and J. Amos.	Journal of the Kent Farmers' Union, Vol. vi., No. 5, p. 103, November, 1919.	No reprints.
G2.	Variety Trials with Potatoes, 1919-20. By R. G. Hatton.	Ditto, Vol. ix., No. 1, p. 21, January, 1921.	Ditto.
G3.	Ditto, 1921 By J. Amos.	Dittto, Vol. xi., No. 1, p. 20, January, 1922.	Ditto.
G4.	Potato Trials at East Malling Research Station, 1923. By R. G. Hatton and J. Amos.	Journal of the Kent Farmers' Union, Vol. xiv., No. 5, p. 166, November, 1923.	Ditto.

‡Reports issued from East Malling by Prof. E. S. Salmon, S.E.A. College, Wye, on data collected jointly upon Hops grown at East Malling.

	TITLE.	JOURNAL OF PUBLICATION.	REPRINTS.
G5.	Potato Trials at East Malling Research Station, 1924. By R. G. Hatton and J. Amos.	Ditto, Vol. xvi., No. 5, p. 167, No. 6, p. 213, November, ane December, 1924, and Annual Report of the East Malling Research Station, 1924, pp. 189-194.	Ditto. Ditto.
G6.	Spraying Trials with Potatoes, 1918. By Prof. E. S. Salmon and H. Wormald.	Journal of the Board of Agriculture, Vol. xxvi., No. 1, p. 71, April, 1919.	Ditto.
G7.	Potato Spraying. "Three Years' Results at East Malling Research Station." By R. G. Hatton.	Journal of the Kent Farmers' Union, Vol. x., No. 1, p. 8, July, 1921.	Ditto.
	Corn.		
G8.	Variety Trials with Oats and Barley. Spring, 1920. By R. G. Hatton.	Journal of the Kent Farmers' Union, Vol. viii., No. 6, p. 148, December, 1920.	Ditto.
G9.	Wheat Trials at East Malling, 1921. By J. Amos.	Ditto, Vol. x., No. 3, p. 91, September, 1921.	Ditto.
G10.	Winter Corn Trials (Wheat and Oats). 1921-22. By J. Amos.	Ditto, Vol. xii., No. 5, p. 164, November, 1922.	Ditto.
G11.	Winter Oat Trials, 1922-23. By J. Amos.	Ditto, Vol. xiv., No. 5, p. 165, November, 1923.	Ditto.
G12.	Corn Trials, 1923-24. By R. G. Hatton and J. Amos.	Ditto, Vol. xvi., No. 3, p. 93, September, 1924.	Ditto.
G13.	Runner Bean Trials. 1924. By H. C. Chapelow.	Annual Report of the East Malling Research Station, 1924, pp. 195-203.	Ditto.
	METEOROLOGY.		
H1.	Meteorological Observations.	Contributed monthly to the Kent Farmers' Union Journal.	Ditto.
H2.	Weather Conditions during 1024. By H. M. Tydeman.	Annual, Report of the East Malling Research Station, 1924 p. 204.	Ditto.
*H9.	,, ,, ,, 1926. By H. C. Chapelow and H. M. Tydeman.	Annual Report of the East Malling Research Station, 1926, p. 81-83.	Ditto.
	ANNUAL REPORTS.		
A1.	,, ,, 1920. In 1914, 15, 16.	Brief leaflets outlining initiation of experiments, etc., were published as from "Wye College Fruit Experiment Station," Kent.	
A2.	,, ,, 1921. In 1917, 18, 19.	Reports became fuller and were incorporated with those of the Research and Advisory Department, S.E.A. College, Wye, Kent.	
A3.	,, ,, 1922. In 1920, 21.	After incorporation as an independent Research Institute reports were printed in the Journal of Kent Farmers' Union (December, 1920 to February, 1922).	

	TITLE.	JOURNAL OF PUBLICATION.	REPRINTS.
A4.	Annual Report, 1923. In 1922, 23, 24.	The Annual Report took the present form of independent publications. That for 1922 is now out of print. The 1923 Volume is still obtainable, price 3s. 4d.	
A5.	,, ,, 1924.	East Malling Research Station.	Price 5s., postage 6d.
A6.	,, ,, 1925.	East Malling Research Station.	Price 2s. 3d., postage 4d.
A7.	,, ,, (II Supplement), 1925.	Special Scientific Articles under Pomology, Physiology, Pathology and Entomology.	Price, members 4s. 5d., Non-members 5s. 6d., Postage 5d.
A8.	,, ,, (I. General), 1926.	Ditto.	Price 2s. 3d., postage 4d.
	Popular Articles Contributed to Various Journals.		
H3.	Progress in Methods of Practical Fruit Growing. By R. G. Hatton.	Journal of Royal Agricultural Society of England, Vol. 82, pp. 49-117, 1921.	To be obtained only from Publishers, John Murray, Albemarle St., London.
H4.	Fruit Growing in Small Gardens. By R. G. Hatton.	The Garden, Vol. lxxxviii., Nos. 2727, 2728, 2729, 2730, 2731. February to March, 1924.	No reprints.
H5.	The Control of the Fruit Tree Through its Roots. By R. G. Hatton.	"Country Life," Vol. lv., No. 1430, pp. 867-869, June, 1924.	Ditto.
H6.	Pruning Neglected Fruit Trees. By N. H. Grubb and A. W. Witt.	The Garden, Vol. lxxxviii., No. 2726, pp. 88-89, 16th February, 1924.	Ditto.
H7.	"Notes to Fruit Growers."	Contributed monthly to Journal of the Kent Farmers' Union.	Ditto.
H8.	Details of Membership.	East Malling Research Station, 1925.	Reprints.
H10.	Rules of Membership.	East Malling Research Station, 1926, pp. 95-96.	Ditto.

RULES OF ASSOCIATE MEMBERSHIP OF THE KENT INCORPORATED SOCIETY FOR PROMOTING EXPERIMENTS IN HORTICULTURE.

EAST MALLING RESEARCH STATION, KENT.

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(*b*) To obtain a reduction of fee where special services (such as the "roguing" of stock beds, etc.), involve extended journeys and visits.

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* Denotes Annual Membership as distinct from Life Membership.

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Bunyard & Co.	..	The Royal Nurseries, Maidstone, Kent.
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Chambers, J. J.	..	Manor House, Southfleet, Gravesend, Kent.
Champion, B.	..	Baron's Place, Mereworth, Kent.
Chivers & Sons	..	Histon, Cambridge.
Clarke, Foster	..	Boughton Mount, Maidstone, Kent.
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Cohen, Lady Louisa	..	Shoreham, Sevenoaks, Kent.
Collet, Sir Mark	..	St. Clere, Kemsing, Sevenoaks, Kent.
Colthup, W.	..	Harbledown, Canterbury, Kent.
Cornwallis, Rt. Hon. Lord of Linton	..	Linton Park, Maidstone, Kent.
Dalgleish, J. E.	..	The Nurseries, Market Weighton, Yorks.
Dean, C. H.	..	Whitehall Preserve Works, Sittingbourne, Kent.
Dennis, W., & Sons	..	Kirton, Lincs.
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Durham, Dr. H.	..	Dunelm, Hereford.
Edmonds, J., & Sons	..	Allington, Maidstone, Kent.
Elms, F. A.	..	Days Lane Farm, Sidcup, Kent.
Emmet, Thomas	..	Castle Farm, Amberley, Sussex.

Faversham Branch N.F.U.	33, Roman Road, Faversham, Kent.
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George, David Lloyd ..	Churt, Surrey.
Grenwell, Sir Bernard ..	Estate Office, Marden Park, Woldingham, Surrey.
Hardy, Lawrence ..	Sandling Park, Hythe, Kent.
Harlow, T. T. ..	Ditton Court Farm, Ditton, Kent.
Harris, Lord ..	Belmont, Faversham, Kent.
Hart, W. B. ..	Standen, Farm, Benenden, Kent.
Higgs, J. M. ..	Farnborough Hall, Farm, Farnborough, Sevenoaks, Kent.
Hinge, John ..	Toppesfield, Sittingbourne Road, Maidstone, Kent.
Hop Control ..	7, Southwark Street, London, S.E.1.
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Neame, F., and T.	..	The Offices, Macknade, Faversham, Kent.
Nettlefold, A.	..	The Park, Wrotham, Kent.
Notcutt, R. C.	..	The Nursery, Woodbridge, Suffolk.
Overy, E. J.	..	Mascalls Court, Paddock Wood, Kent.
Pearson, W., & Son	..	The Nurseries, Lowdham, Notts.
Pickstone, H. E. V.	..	Simondium, Cape of Good Hope, South Africa.
Podmore, J. H.	..	Moatlands, Paddock Wood, Kent.
Phillpotts, G. S.	..	Oakfield, Foxrock, Co. Dublin.
Rivers, Messrs.	..	The Nurseries, Sawbridgeworth, Herts.
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Sittingbourne and Faversham Branches, N.F.U.	..	43, Park Road, Sittingbourne, Kent.
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Smith, C. S.	..	Elm House, Boughton Monchelsea, near Maidstone, Kent.
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Spence, Howard	..	Red House, Ainsdale, Southport, Lancashire.
Spooner & Sons	..	The Nurseries, Hounslow, Middlesex.
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Tolhurst, Thos.	..	Bennetts, Horsmonden, Kent.
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Basham, J., & Sons	..	Fairoak Nurseries, Bassaleg, Newport, Mon.
Batchelor, G. A.	..	Galtons Farm, Cliffe, Kent.
Bellairs, Com. G.	..	Gore Court, Otham, Maidstone, Kent.
Bellingham, W. J.	..	Newnham Farm, Boxley, Maidstone, Kent.
Benenden Branch, N.F.U.		Bishopsden, Biddenden, Kent.
Bide & Son	..	Alma Nurseries, Farnham, Surrey.
Blundell, H.	..	Halstead, Sevenoaks, Kent.
Body, John, Colonel	..	Wittersham Court, Wittersham, Kent.
Booth, Sir Gore	..	Lissadell Nurseries, Sligo, Ireland.
Bourne, Felix	..	226, High Street, Chatham, Kent.
Brice, W. St J.	..	Goddings, Borstal, Rochester, Kent.
Brice, W.	..	Rings Hill Lodge, Borstal, Rochester, Kent.
*Bromley, Warner N. B.	..	Finsbury House, Blomfield Street, London, E.C.2.
Camden, Marquis	..	Bayham Abbey, Lamberhurst, Kent.
Canterbury Branch, N.F.U.		11, St. Margaret's Street, Canterbury, Kent.
Chairman	..	Ashford Branch, N.F.U., 2a, Bank Street, Ashford, Kent.
Chambers, H. G.	..	Greenhill, Otham, Maidstone, Kent.
Champion, B. A.	..	13b, Lowfield Street, Dartford, Kent.
Cheetham, Capt. C. E.	..	Poplar Hall, Faversham, Kent.
Clark, Messrs. G. A.	..	The Nurseries, Dover, Kent.
Clark, W. F.	..	Hanslett Farm, Ospringe, Kent.
*Clarke, Baron	..	Hilltop Fruit Farm, Great Blakenham, Suffolk.
Clay, Spender, Col. H.	..	2, Hyde Park Street, London, W.2.
*Cobley Ltd., S.	..	4, Tavistock Street, Covent Garden, W.C.2.
Collyer, B.	..	Cart House Lane, Woking, Surrey.
*Columbo Commercial Co.		The Secretary, Thames House, Queen Street Place, London, E.C.4.
Coombes, F.	..	Mill Lane Nursery, Bebington, Cheshire.
*Cracknell, Miss	..	School of Nature Study and Gardening, Clapham, near Worthing, Sussex.

Crawford, T.	..	Gore House, Upchurch, Sittingbourne, Kent.
Crowhurst, A. S.	..	Charton Farm, Farningham, Kent.
Daw, F. B.	..	Woodmanton, Highcliffe-on-Sea, Hants.
Day & Tassell	..	Tutsham Farm, West Farleigh, Maidstone, Kent.
Day, Geo.	..	North Ash Farm, Ash, Wrotham, Kent.
Day, Ed.	..	The Thorn, Marden, Kent.
Daniels Bros.	..	The Nurseries, Norwich, Norfolk.
Edgecombe, G. R.	..	The Warren, Brenchley, Kent.
Egerton Branch, N.F.U.	..	W. Roy Wilthew, Court Lodge, Egerton, Kent.
Elgar, W. R.	..	43, Park Road, Sittingbourne, Kent.
English, O.	..	Manor Farm, Wateringbury, Maidstone, Kent.
English, W. D.	..	Chapter Farm, Frindsbury, Strood, Kent.
Falmouth, Viscount	..	2, St. James Square, London, S.W.
*Favell, C. R.	..	11, Arlington Road, Eastbourne, Sussex.
Finn, G. W., & Sons	..	The Mall, Faversham, Kent.
Fitzgerald, Rev.	..	Lidwells, Goudhurst, Kent.
Francis & Ackworth	..	Howberry Farm, Erith, Kent.
Francis, D. L.	..	Green Trees, near Tonbridge, Kent.
Fremlin, Messrs.	..	The Brewery, Maidstone, Kent.
French, W.	..	Hooks Place Farm, Southfleet, Gravesend, Kent.
Gascoyne, E. B.	..	Bapchild, Sittingbourne, Kent.
Gaskain, W. F.	..	Dargate, Faversham, Kent.
Gibson, B. L.	..	East Wickham, Welling, Kent.
Gill, Major J. H.	..	Foxglove, Willesborough, near, Ashford, Kent.
Goldsmid, E. d'A.	..	Somerhill, Tonbridge, Kent.
Goodwin, E.	..	Canon Court, Wateringbury, Maidstone, Kent.
Goodwin, W. Gordon	..	Elliots Farm, Penshurst, Kent.
Goodwin, W.	..	Paul's Farm, Leigh, Tonbridge, Kent.
*Greenfield, A.	..	Ruffetts, Ryarsh, Kent.
Greenlees, W.	..	Woodgate, Borden, Kent.
Grubb, N. H.	..	The Research Station, East Malling, Kent.
Gunther, C. E.	..	Tongswood, Hawkhurst, Kent.
Gurr, Hy.	..	48, Maidstone Road, Chatham, Kent.
Haggard, A.	..	Manager, The Hilltop Fruit Farm, Ledbury, Herefordshire.
Hales, H.	..	Paradise Farm, Hartlip, Sittingbourne, Kent.
Hampshire Branch, N.F.U.		Westgate Chambers, Winchester, Hants.

Hardy, L.	..	The Vale, Addington, West Malling, Kent.
Haynes, L.P.	..	Ockham, Bodiam, Hawkhurst, Kent.
Higgs, J. V.	..	Court Farm, Selling, Kent.
Hillier & Sons	..	95, High Street, Winchester, Hampshire.
Hinge, A.	..	Home Farm, Borden, Sittingbourne, Kent.
*Holdsworth, R.	..	Bellchambers, Kirdford, Sussex.
Hollands, E.	..	Green Farm, Shorne, Gravesend, Kent.
Holm, J. C.	..	Allhallows, Rochester, Kent.
Hubble, W. W.	..	Harbledown, Canterbury, Kent.
Hubble, Messrs.	..	Hunton Court Farm, Hunton, Maidstone, Kent.
Ingleton, E. J.	..	Wybourne Farm, High Halstow, near Rochester, Kent.
Jackman, G., & Son	..	The Nurseries, Woking, Surrey.
Jackson & Sons	..	Hockenden, Swanley, Kent.
Kelsey, E. B.	..	Wickham Court, Canterbury, Kent.
Kings Acre Nurseries	..	Hereford.
Kitchen, J.	..	Boughton Place, Sandway, Maidstone, Kent.
Large, J. D.	..	Cherry Gardens, Goudhurst, Kent.
Lawrey, John	..	Covent Garden Market, London, W.C.
Laxton Bros.	..	63, High Street, Bedford
Leney, Hy.	..	Selling Court, Faversham, Kent.
Little, S. H.	..	Crouch, Borough Green, Sevenoaks, Kent.
London School Gardening Association	..	95, Arngask Road, Catford, S.E.6.
Long, Glover	..	Dairy Farm, Higham, Rochester, Kent.
Lumsden, J.	..	The Dell, Stone Street, Sevenoaks, Kent.
Manger & Henley, Messrs.	..	59, Borough, London, S.E.1.
Mannington, E.	..	Tanner House, Marden, Kent.
Marden Fruit Growers Association	..	Marden, Kent.
Marsham, G.	..	Hayle Cottage, Maidstone, Kent.
Maxted, J. D.	..	Newlands, Teynham, Kent.
Maxwell, W.	..	Westwood Farm, Sidcup, Kent.
Mercer, A. L.	..	North Court, Sittingbourne, Kent.
Mitchell, R.	..	Foxbury Farm, Stone Street, Sevenoaks.
Mount & Sons	..	The Nurseries, Canterbury, Kent.

*Murphy & Sons	Sheen Lane, Mortlake, S.W.14.
McLean, T. B.	East Court, Chalk, Gravesend, Kent.
McLean, L.	Tong, near Gravesend, Kent.
Naughton, A. G.	Pettings Ash, Wrotham, Kent.
Nevill, Hon. R. P.	Birling House, Birling, West Malling, Kent.
Noakes, W. J.	Trottenden, Goudhurst, Kent.
Northampton Branch, N.F.U.	11 and 12, Lloyds Bank Chambers, George Row, Northampton.
North of England Horticultural Society	Rev. Bernard Hall, Farnham Vicarage, Knaresborough, Yorks.
Norton, Capt. A.	Downs House, Yalding, Kent.
Oyler, Potter	Claxfield, Lynsted, near Sittingbourne, Kent.
Paddock Wood Branch, N.F.U.	Tudor House, King Street, Maidstone, Kent.
Pain, A. E.	Black Hall Farm, Sevenoaks, Kent.
Peerless, T.	Little Brook Manor, Dartford, Kent.
Pennell & Sons	The Nurseries, Lincoln.
Prall & Sons	Matfield Nurseries, Paddock Wood, Kent.
Pye, Wm.	Jeskyns Court, Cobham, Rochester, Kent.
Pyne, G.	Denvers Nursery, Topsham, Devon.
Reader, H.	Pike Fish Farm, Yalding, Kent.
Rice, H. E. H.	North Court, Eastry, Kent.
*Richards, W.	Poulters, Bentley, Hants.
*Robbins, A. J.	Vicarage Farm, Hounslow, Middlesex.
Rogers, Samuel	Kidbrooke Manor, Blackheath, Kent.
Rogers, Lt.-Col.	Riverhill, Sevenoaks, Kent.
Scott, Mrs. F.	Rainham, near Sittingbourne, Kent.
Seabrook & Sons	The Nurseries, Chelmsford, Essex.
Sheldon, W.	Long Land, Bexley Heath, Kent.
Simmonds, C.	Stilstead, East Peckham, Kent.
Smith, King N.	Platt Farm, Borough Green, Sevenoaks, Kent.
Staplehurst Branch, N.F.U.	9, King Street, Maidstone, Kent.
Steel, Strang, Major, M.P.	33, Lennox Gardens, London, S.W.
Streeton, F. O.	High Hilden, Hildenborough, Tonbridge, Kent.
Sutton, J.	Clement Street, Swanley, Kent.

Taylor, E.	..	Bell Farm, Barming, near Maidstone, Kent.
Theosophical Educational Trust	..	Maryland, Letchworth, Herts.
*Tickler, T. G., Ltd.	..	The Fruit Farms, Bradley, near Grimsby, Lincs.
Tompsett, B. H.	..	The Moors, Marden, Kent.
Treseder, W., & Co.	..	The Nurseries, Cardiff, Wales.
Triplow, H.	..	Moat Farm, Iwade, Sittingbourne, Kent.
Tuff, B.	..	Coombe Farm, Allhallows, Rochester, Kent.
Veitch & Sons	..	The Royal Nurseries, Exeter, Devon.
Vinson, O.	..	Ruxley, Foots Cray, Kent.
Wakeley Bros.	..	Station Buildings, Rainham, Kent.
Warde, Sir Charles	..	Barham Court, Maidstone, Kent.
Watson & Sons	..	Killkinny Nurseries, Co. Dublin, Ireland.
*West, Samuel	..	Ewhurst Place, Hawkhurst, Kent.
Wheler, Major Sir	..	Ottenden Place, Faversham, Kent.
Whitebread, A. E.	..	The Mount, Frindsbury, Strood, Kent.
Wickham & Co.	..	Conglelow, Yalding, Kent.
Williams & Co.	..	Ivy House, Edenbridge, Kent.
Wimshurst, T.	..	Tibbs Court, Brenchley, Kent.
Winch, W. H., & Sons	..	Stone Street, Cranbrook, Kent.
Wood, W. F.	..	Chekes Court, Sittingbourne, Kent.
Wood, W. S.	..	Rodfield, Sittingbourne, Kent.
Woodward, G., & Sons		Hayden Cross, Southfleet, Gravesend, Kent.
Worthington, G. W.	..	Wyecroft Manor, Axminster, Devon.
Wright, H. E.	..	Wickhurst, Leigh, Kent.

Group C—"Associates."

*Alexander, W.	..	Home Farm, Eynsford, Kent.
*Allen, G. Major	..	Payne Street, Charing, Kent.
*Amos, Miss Mary	..	Beyton Cottage, Bury-St-Edmunds, Suffolk.
Amos, R. B.	..	Gosmere, Faversham, Kent.
*Ascherson, C. S.	..	Stede Court, Harrietsham, Kent.
*Aspland, A. Lees	..	"Kalgan," Welwyn, Herts.
Auger, W. J.	..	Magpie Hall Road, Chatham, Kent.
Balfour, Hon. H. R. C.	..	Dunstead, Bures, Suffolk.
Ballard, G.	..	Grange Farm, Strood, Kent.
Bamber & Sons	..	Elm, Wisbech, Cambs.

Barnes, T.	..	Mote Farm, Ivy Hatch, Ightham, Kent.
Batchelor, R. D.	..	Darland House, Chatham, Kent.
Batchelor, A. G.	..	Charnal Street Far, Hoo, Rochester, Kent.
*Batt, R. C., Col.	..	The Gresham Farm, Gresham, Hall, Norwich, Norfolk.
*Bear, E. M.	..	Magham Down, Hailsham, Sussex.
Beauford, F. S.	..	Troston Hall, Bury-St-Edmunds, Suffolk.
*Belcher, W. S.	..	Strawberry Acre, Twyford, near Reading, Berks.
Bellingham, H. A.	..	Upper Fant Farm, Maidstone, Kent.
Benstead, E. A.	..	The Lawn, Sittingbourne, Kent.
Berney, A. H.	..	Mereworth, Kent.
Bett, R.	..	Court Lodge Farm, Stoke, Kent.
Blest, F.	..	Wateringbury, Kent.
Bones, A. J.	..	Dargate, Faversham, Kent.
*Bowering, Arthur	..	The Oaks, Goudhurst, Kent.
Brinkmam Bros.	..	Chertsey Lane Nurseries, Chertsey, Surrey.
*Bunbury, Captain C. T. A.		The Garden House, St. Michaels Manor, St. Albans, Herts.
Burns, E. B., Major	..	Riverside, Yalding, Kent.
*Burrell, R. J.	..	Risby Place, Bury-St-Edmunds, Suffolk.
Buxton, A. F.	..	Fairhill, Tonbridge, Kent.
Calcutt, H.	..	Four Wents, Cranbrook, Kent.
*Casson, H. A.	..	Tyn-Y-Cœd, Arthog, North Wales.
Castle & Sons	..	Ash, near Canterbury, Kent.
Castle, G.	..	North Street Farm, Hoo, Rochester, Kent.
Cole, E.	..	Rye House Farm, Dunton Green, Kent.
*Cook, Morton L.	..	Kingston Orchards, Kingston-by-Sea, Sussex.
Cooper, H.	..	Hayeswood, Pembury, Tunbridge Wells, Kent.
Cooper, J.	..	Marden, Kent.
Corfe & Sons	..	5, Gabriels Hill, Maidstone, Kent.
*Cornwell, B.	..	118, Park Road, Sittingbourne, Kent.
Courthope, Col. H.	..	Whiligh, near Ticehurst, Sussex.
Cox, P. W.	..	Rock Lees, Upper Fant Road, Maidstone, Kent.
Croft, Major D. G. S.	..	Fruit Farm, Bartestree, Hereford.
*Cubitt, E. G.	..	Honing Hall, Worstead, Norwich, Norfolk.
Curling, J. H.	..	Perry Court, Faversham, Kent.
*Danreuther, H.	..	Battle Fruit Farm, Battle, Sussex.
Darnley, Earl of	..	Cobham Hall, Cobham, near Rochester, Kent.
Day, Alfred	..	Tong Farm, Headcorn, Kent.

Dennis & Cooper	..	Covent Garden Market, London, W.C.2.
Dennis, T. G.	..	Dunton Farm, Dunton Green, Kent.
*Dixon, T. and M.	..	Tardebigge, Bromsgrove, Worcestershire.
*Dow, A.	..	Rats Castle, Biddenden, Kent.
Duckham, A.	..	Rooks Hill, Sevenoaks, Kent.
Durling, W.	..	Ightham, Kent.
East, F. E.	..	Matfield, Kent.
Edmonds, J.	..	Hill Farm, Higham, Strood, Kent.
*Elsdon, A. C.	..	Snape, Saxmundham, Suffolk.
Everest, W.	..	Crockenhill, Swanley, Kent.
Fife, J.	..	West Yaldham, Kemsing, Sevenoaks, Kent.
Finnis, J. T.	..	Collier Street, Marden, Kent.
Fisher, C.	..	Crescent Farm, Sidcup, Kent.
Francis, F.	..	Dartford, Kent.
French, P.	..	Teynham, Sittingbourne, Kent.
French, R. S.	..	Hoo Green, Meopham, Kent.
Fromow, W., & Sons	..	Windlesham Nurseries, Surrey.
*Fryer, P. J.	..	(Wm. Cooper & Nephews, Australia,) 4, O'Connell Street, Sydney, N.S.W.
Furner, W. G.	..	Venners Farm, Erith, Kent.
*Gamble, Oswald	..	Dunedin, Mark Cross, Tunbridge Wells, Kent.
Gillespie, D.	..	Stone Hill Farm, Egerton, Kent.
*Gillian & Son	..	Tongham Fruit Farm, Surrey.
Glen, W.	..	Otford, near Sevenoaks, Kent.
Golding, E. C.	..	Bencleaves, Tonbridge, Kent.
Goodridge, Rear Admiral	..	Rudgwick Fruit Farm, Rudgwick, Sussex.
*Gordon, A., Colonel	..	Warwick Farm, Mulders' Vlei, Cape Province, South Africa.
Gorringe, S. B.	..	Hulbury Farm, Swanley, Kent.
*Grey, Countess (Mabel)	..	Howick, Alnwick, Northumberland.
Gribble, T.	..	Hollenden, Underriver, Kent.
*Groom, H. C., & Co.	..	Bellevue Farm, Guilden Sutton, Chester.
Guildford, Earl	..	Waldershare Park, Dover, Kent.
*Hall, F. V.	..	Birks Grange, Exeter, Devon.
*Hall, Rev. R.	..	The Manse, Rescobie, Forfarshire.
Harden, H.	..	Wickhurst Farm, Sevenoaks, Kent.
*Harraway & Sons	..	The Nurseries, Warminster, Wiltshire.

Harris, T. D.	..	Tudeley Hall, Tonbridge, Kent.
Harrison, E. H.	..	Dux Court, High Halstow, Gravesend, Kent.
*Harthan, Dr. G. E.	..	Badgers Hall, Evesham, Worcs.
Hartley Bros.	..	Weavills Farm, Bishopstoke, Hants.
*Hartley Co-Operative Agricultural Society	..	Longfield, Kent.
Highwood, W.	..	Hertsfield, Marden, Kent.
*Hitchins, P. E. N.	..	Stream View Nurseries, Horeham Road, Sussex.
Hollands, J. and F.	..	Kings Farm, Shorne, Gravesend, Kent.
*Hollands, W. T.	..	Court Lodge, West Malling, Kent.
Hole, H.	..	Southernhay, Underriver, Kent.
Honness, A. W.	..	Great Cheveney, Marden, Kent.
Horne Bros.	..	Berry Hill, Cliffe, Kent.
Horrocks, W. E.	..	Wheatley, Retford, Notts.
Hubble, A. W.	..	The Elms, Hunton, Maidstone', Kent.
Hubble, T. W.	..	Elphicks, Hunton, Maidstone, Kent.
Hubble, W. L.	..	Hernhill, Faversham, Kent.
Ingleby, E. J.	..	Forest and Orchard Nurseries, Milbury Heath, Fairfield, Glos.
Ingleton, H. J.	..	Fenn Farm, St. Marys, Rochester, Kent.
*Jackson, W. T.	..	117, High Street, Sittingbourne, Kent.
Jordan, P. O. L., Lt.-Col.		Stubble Hill, Harrietsham, Kent.
*Kallen, Van Der	..	Boskoop, Holland.
Kendall, C. T.	..	Home Farm, Shoreham, Gravesend, Kent.
*Kenyon, G. H.	..	Crundalls, Matfield, Kent.
Kipping, H. G.	..	Bartrams Farm, Sevenoaks, Kent.
Kleinwort, H. G.	..	Amberfield Farm, Chart Sutton, Kent.
*Lacey, G. W.	..	Warmsley, Bristol, Gloucestershire.
*Langrish & Chalcraft	..	Wheatley, near Bordon, Hants.
Latter & Sons	..	Borough, London, S.E.1.
Lawrence, Geo.	..	Hayle, Horsmonden, Kent.
Leggett, J.	..	Hatchlands Farm, Weald, Kent.
Leney, P.	..	Upper Ensign, Chilham, Kent.
Lennard, Sir H. F.	..	Wickham Court, Wickham, Kent.
Lewis, Messrs. E. H., & Sons		Covent Garden, London, W.C.
*Lewis, N. S.	..	Mumford, Wittersham, Kent.
Lewis, J.	..	Petham Court, Swanley Junction, Kent.

Lidiard, B. S.	..	Waltham, St. Lawrence Fruit Farm, Twyford, Berks.
Lobjoit, W. J.	..	Oakdene, Wooburn, Bucks.
*Locket-Wood, Dr. T.	..	Holme Estate, Bratton Westbury, Wilts.
*Luck, Colonel B. J. M.	..	The Hermitage, West Malling, Kent.
Mackledon, E.	..	Grove House, Bobbing, Sittingbourne, Kent.
Mackinnon, P. G.	..	Cockham Hill, Edenbridge, Kent.
Manwaring, H. T. W.	..	Whitewoods, Horsmonden, Kent.
Manwaring, W.	..	Martins Farm, Collier Street, Marden, Kent.
Marriage, W.	..	Brabourne Farm, Sevenoaks, Kent.
*Marshall, N. V.	..	West Barnham Fruit Farm, Barnham, Sussex.
Matthews, H. J.	..	52, High Street, Borough, S.E.
Maxted, J.	..	Rock Farm, Nettlestead, Kent.
Mercer, R.	..	Rodmersham, Sittingbourne, Kent.
Mercer, R. M.	..	The Batteries, Lynsted, Kent.
Miles, W.	..	Wall End Farm, Isle of Grain, Kent.
Miller, W. C.	..	Austin Lodge, Eynsford, Kent.
Milroy, T.	..	Dale Farm, Sevenoaks, Kent.
Miskin, W.	..	White Hall, Hoo, Rochester, Kent.
*Moore, H. G.	..	Ebrington, Herrington Road, Dorchester, Dorset.
*Moore, Messrs. F. W.	..	Clarence House, 8, Arthur Street, E.C.4.
*Morford, L.	..	Parsonage Farm, Paddock Wood, Kent.
*Moseley, R.	..	Sherfield English, Romsey, Hants.
Mount, H.	..	Woolton Farm, Bekesbourne, Canterbury, Kent.
Muggeridge, J.	..	Mackays Court, Stoke, Kent.
Muggeridge, E.	..	White House Farm, Isle of Grain, Kent.
Muggeridge, A.	..	Turkey Farm, Stoke, Kent.
*Murton, E.	..	Gipps Close, Langton, Tunbridge Wells, Kent.
Napier, J. R. H.	..	Little Slifehurst, Kirdford, Sussex.
Nicholson, T. J.	..	Broadford, Horsmonden, Kent.
*Norfolk East Fruit Growers' Association	..	Wroxham, Norfolk.
Norman, A. J.	..	Rookery, Bromley, Kent.
Northcote, R. H. S.	..	Fritham House, Fritham, Hants.
*Norton, Capt. R. A.	..	Downs House, Yalding, Kent.
Osenton, W. F.	..	Buck Hole, High Halstow, Kent.
Osenton, Stanley	..	Dalhams Farm, High Halstow, Kent.

Palmer, R. E.	..	Park Farm, Brasted, Kent.
*Pardoe, F. S.	..	Hazledene, Horeham Road, Sussex.
*Parsons, E.	..	49, Queen Anne Street, London, W.1.
Payne, H.	..	Court Lodge Farm, West Farleigh, Kent.
Pears, J., and Haynes	..	Inwood, Nettlestead, Kent.
Pemberton, Leigh W.		Torry Hill, Frinsted, Kent.
*Pewtress, H. J.	..	Tillington, Hereford.
Plumptre, H. F.	..	Goodnestone Park, Canterbury, Kent.
*Pounds, A. W.	..	37, Wood Street, Barnet, Herts.
*Poupart, J.	..	Holly Lodge, Walton-on-Thames, Surrey.
*Priestley, Sid.	..	Brackley, Carr Wood Road, Bramhall, Cheshire.
Pye, J.	..	Knights' Place, Rochester, Kent.
Pye, J. W.	..	Ranscombe Farm, Cuxton, Kent.
*Pye, L. K.	..	Burleigh, Cobham, Rochester, Kent.
*Ravenhill, W.	..	Loseberry, Claygate, Surrey.
Reader, H.	..	Old Hay, Brenchley, Kent.
Renwick, J.	..	Pankhurst Farm, Weald, Kent.
*Reynolds, G.	..	35, The Avenue, Watford, Herts.
*Riley, L.	..	Derbyfields near Warnborough, Basingstoke, Hants.
Roberts, H. G.	..	Budleigh Salterton, Devon.
Rolvenden Branch, N.F.U.		Bull Farm, Rolvenden, Kent.
Rolvenden Branch, N.F.U.		Forsham Farm, Rolvenden, Kent.
Scott, E. L.	..	Cryals, Matfield, Kent.
*Scrutton, Miss M. E.	..	Bottrells' Cottage, Chalfont St. Giles, Bucks.
Sedgwick, C.	..	Salter Heath Farm, Riverhead, Kent.
Skilton, W. F.	..	Market Square, Bromley, Kent.
*Sowrey, J.	..	Yeoveney Moor, Staines, Middlesex.
Stevens, A.	..	Breach, Newington, Kent.
Stevens, E.	..	Uppertoes, Bobbing, Sittingbourne, Kent.
Stevens, S.	..	Place Farm, Hartlip, Sittingbourne, Kent.
Strouts, R. S.	..	Winburne, North Road, Hythe, Kent.
Strover, W. H.	..	The Cock Inn, Isle of Grain, Kent.
*Tapsfield, W.	..	Whetstead, Five Oak Green, Kent.
*Talbot Estates Ltd.	..	37, Pelham Road, Gravesend, Kent.
*Thom, W.	..	Dynes Farm, Kemsing, Sevenoaks, Kent.
Thomson, D.	..	Westfield Farm, Addington, Kent.
Townshend, Marsham H. S.		Scadbury Park, Chislehurst, Kent.
Tuff & Sons	..	Craggs Farm, Singlewell, Kent.

Vaux, G. C.	..	15, Cheyne Court, Chelsea, S.W.3.
Vint, C.	..	Drakes Broughton, Pershore, Worcs.
Walker, F. T.	..	Dryhill Farm, near Tonbridge, Kent.
*Wallace, W. E.	..	Poplar Farm, Eaton Bray, Dunstable, Bedford.
*Waterer, J. & Co.	..	The Nurseries, Twyford, Berks.
Waters, J. R. N.	..	Fawke Farm, Sevenoaks, Kent.
Weald of Kent Farmers' Club		Hancocks Farm, Cranbrook, Kent.
Wells, J.	..	York Farm, Gillingham, Kent.
Westacott, P.	..	Turvins Farm, Cheveney, Kent.
Western, Capt. F.	..	Scraces, Barming, Kent.
Wheeler, L.	..	Bockingfold, Marden, Kent.
*White & Hiller	..	Dunnington Heath Farm, Alcester, Warwickshire.
*Whittome, J. E.	..	Turnhams Gill, Henfield, Sussex.
*Wickham, R. D.	..	Gate House, Brenchley, Kent.
Wilthew, W. R.	..	Court Lodge, Egerton, Kent.
*Witherby, G. E. O.	..	23, De Vere Gardens, London, W.8.
Wittersham Branch, N.F.U.		Underhill, Wittersham, Kent.
Wood, E. W.	..	Stone House Farm, Frindsbury, Strood, Kent.
Wood, M. S.	..	Green Street Farm, Orpington, Kent.

New Building (by Forsyth and Maule), containing Administrative Quarters on ground floor, Mycological, Entomological and Biochemical Laboratories above.